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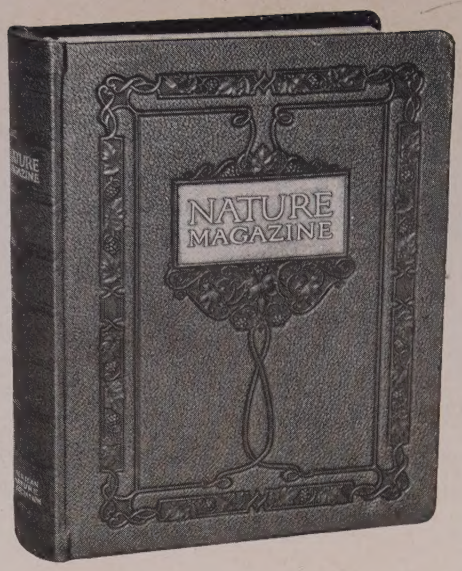

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Nature News and Views

The Deadly Nightshade

While the black berries of *Solanum nigrum* are commonly eaten without bad results, it seems advisable to call attention to the fact that the red berries of another species, *Solanum dulcamara*, are sometimes poisonous. The berries of several species of nightshade contain solanine, an alkaloid used in medicine, overdoses of which are dangerous. The fruit of any nightshade is much more likely to be harmful if eaten when unripe, and especially when uncooked.

A Novel Contest

By Mabel Travis Wood

The elephant in Marsalis Park Zoo, Dallas, Texas, fixed his grave gaze upon a band of children, who eyed him, in turn, with exceeding respect. For they had recently discovered that he was one of the "Proboscidea," to which honored order only elephants, living or extinct, can qualify.

The number on his cage was duly noted and his name and habitat written beside that number upon a card which each of the children carried. Passing on to the "Aves," the young naturalists quickly distinguished between the songbirds, quail and pheasant varieties, web-footed swimmers and other varieties. And so on through 1925 specimens of birds, beasts and reptiles.

This unique Zoological Memory Contest was originated by Mr. W. F. Jacoby, director of parks and playgrounds in Dallas, for the purpose of familiarizing the city's children with the specimens in the zoo, encouraging volunteer study of natural history and promoting a wider use of the parks. About 2,000 children participated. The contest was carried out with the cooperation of the Dallas *Times-Herald*.

Music Memory Contests are a popular activity in municipal playground and recreation work, but it remained for Mr. Jacoby to adapt the idea to Carnivores and Primates rather than to Chopin and Bach. The children were given opportunities to study and read about the animals prior to the contest, then, during the two weeks of the contest, the placards were removed from the cages and numbers substituted.

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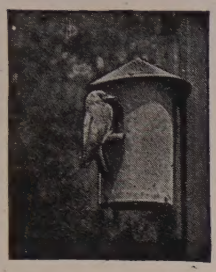

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the plan and is recommending it to recreation officials throughout the country. Dallas intends later to develop a memory contest for trees and flowers in the parks.

Our Migratory Fowl

"There are apparently two great adverse factors directly menacing the perpetuation of our migratory wild fowl, and these overshadow all others. One is the drainage of water areas by man, and the other is a succession of years of scanty rainfall, and its effect on a great area in the west, as indicated by the disappearance there of many ponds and small lakes.

"In efforts to conserve the big-game animals of the country, it has been found that man has occupied most of their former wintering grounds, and the great conservation problem has been one of sufficient winter forage, the summer forage being usually abundant. In the case of migratory wild fowl, there is arising a like problem—that of maintaining sufficient water areas where the birds may feed during their migration and in winter, but there must be retained undisturbed sufficient breeding grounds, the basis of all wild-fowl production.

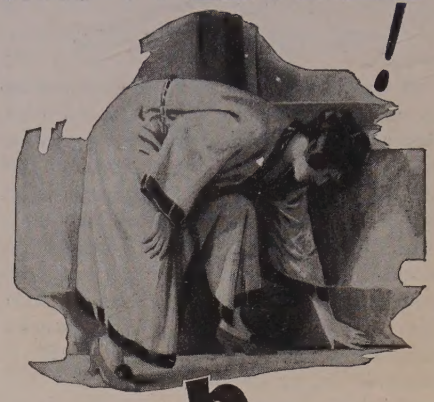
"The danger to the perpetuation of the stock of wild fowl is so great and so imminent from the causes mentioned that there is the most vital need for all conservationists and lovers of wild life to sink petty differences of opinion as to details and to unite in constructive work to insure the future of our migratory game birds."

These three paragraphs constitute the conclusions reached on the basis of investigation of the condition of our migratory wild fowl and set forth in a special report by Edward W. Nelson, chief of the United States Bureau of Biological Survey. The conclusions themselves give pause, and the text of the report upon which they are based does so likewise.

Caterpillar Record

Competition for first honors in gathering the egg masses of the tent caterpillar comes from Rye, New York, where, under the auspices of the Rye Garden Club and the League of Social Service, the school children in grades five to eight gathered 83,752 nests outside of school hours. The highest record for one child was more than 4,000. Rye has about 6,000 inhabitants and four schools.

Be Comfortable this WINTER!



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NATURE IN PRINT

The Odyssey of Bobbie

It was high time that someone placed between covers the glorious Odyssey of Bobbie, that great collie who, responding to the unconquerable urge of home, fought and bled his way from Indiana to Oregon to rejoin his master. Everyone who loves dogs thrilled when the story was given to the world, authentic and stirring, some two years ago. Now from the presses of Dodd, Mead and Company of New York, comes a little book under the title of *Bobbie, A Great Collie,* by Charles Alexander.

Mr. Alexander has done full credit to the wonder of Bobbie's achievement. Into the story as it was reconstructed from the reports of people who had harbored the collie, he has woven much excellent and not exaggerated surmise. The author has written one of the most human and most inspiring animal tales ever put into words. We warn you that you cannot leave Bobbie until you have him once again with his master "howling and crying at the top of his lungs, his heart shaken with joy."

Nature Poems

Anthologies of school-boy-and-girl verse have attracted increased interest since Hughes Mearns published "Creative Youth," his delightful account of an experiment in poetry-writing in Lincoln School. It has been noted by many Nature teachers that pupils in Nature Study classes frequently react in rhythmic form. From the public schools of Atlanta, Georgia, there comes a volume of "Nature Poems" written by the children of the fourth, fifth, and sixth grades, and attractively printed and bound by the printing classes of the Tech High School. The book contains one hundred and ten poems in all, each elementary school having been invited by the director of Elementary Science, Hattie Rainwater, to contribute its three best poems. All are interesting as the creations of very young authors, and several are of noticeable quality. To give an idea of the possibilities in this line we quote a gem from the pen of Mary Meyerson, a sixth-grade girl.

WINTER ROSES

Once in the winter twilight,
When frost was in the air,
I looked at my white rose-vine
All blossomless and bare;
I looked again at dawning;
The garden was deep in snow;
My vine had whiter roses
Than even June could show.

Camera Hunting

"Fortunate, indeed, is the sportsman who selects or blunders into amateur photography as a hobby. He will find this appealing to his many-sided nature, giving him great happiness and satisfaction. . . . He will get keener sport, will require more skill, and derive far greater satisfaction from his 'game' than the hunter with gun and rod."

This is the testimony of William Nesbit, a former game hunter, whose weapon latterly has been the camera, and who is the author of "How to Hunt with the Camera." This volume, from the presses of E. P. Dutton and Company, 681 Fifth Avenue, New York, is a notable piece of work, and a novel one. Mr. Nesbit has not designed this 337-page, profusely illustrated and attractively printed book for the person who is, as he says, content to "push the button and trust to luck." It is rather for the individual willing to expend thought and hard work.

At the outset Mr. Nesbit emphasizes the vital importance of wild life conservation, and then proceeds to a discussion of the various branches of wild life photography. He digresses from this to a discussion of the vanishing animal kingdom of Africa and the photographing of this kingdom. He returns to his immediate subject by way of a chapter on leading wild life photographers, and his concluding chapters are devoted to valuable instruction. Were we to criticize the volume in any general way, it would be on grounds of size (possibly justified, since it gives the illustrations proper value) and lack of index (likewise, no doubt, justified by the assumption of serious reader interest at the outset). Which disposes of our criticisms and permits us to remark that this volume is ten dollars' worth.—R. W. W.

The Vegetable Garden

Emphasis on the value of the school and small home garden as an adjunct to Nature study and as a means of providing the city youngster with something constructive to do during the summer is placed in *School and Home Gardens,* written by Charles L. Quear, director of horticulture in the public schools of Kansas City, Missouri. The little book, which is handy in size and practical in physical character, is published by The University Publishing Company. This volume should be of distinct value to the leader of any work along the line of the small garden.

Into the Bad Lands

Once again we are impressed with the lure of fact in a romantic story when we read *Rainbow Bridge* by Charles L. Bernheimer, now brought out in a popular three-dollar edition by Doubleday-Page and Company, Garden City, Long Island. In this volume Mr. Bernheimer records the fascinating story of three trips into the Bad Lands of Utah and Arizona east of the Colorado River; the discovery of ancient graves and cliff dwellings; the weird and wonderful formations of Nature, the most notable of which is Rainbow Bridge, a natural arch of rock in southern Utah. Throughout the book Mr. Bernheimer has recorded Nature as he saw it in bird and beast, flower and stone. He takes us into his confidence as to the problems of such trips, and in reading his book one feels almost to be aboard a sturdy pack animal on the dangerous mesa trails.

Glacier Park

If the generations that are to come deride us for not conserving for them many of our natural resources, may we hope that, at least, our great National Parks will in some measure mitigate our prodigality. May we hope that these generations will find the Enchanted Trails of Glacier Park about which Agnes C. Laut writes so charmingly in a volume by that title just come from the presses of Robert M. McBride and Company. Miss Laut, of course, always writes admirably, particularly of travel, and here she has a subject worthy of her pen. Widely traveled, schooled in scenery, the author found fresh thrill and inspiration in the glories of the public playground. She has done full justice to the story of our most romantic National Park.

Tips for Fishermen

Mr. W. W. Crosby is an engineer, but in dedicating his little book, *Some Western Fishing,* to Mrs. Crosby he points out parenthetically that she is convinced that his vocation is fishing and his avocation engineering. This attractive little volume gives no small support to her conviction, for it is evidence of some very ardent, widespread and extensive fishing activities in the waters of the west. The book is well illustrated and comes from the presses of Williams and Wilkins, Baltimore.

Another Spell

An apt group title has been given by L. C. Page and Company, 53 Beacon Street, Boston, Massachusetts, to the set of attractive travel books to which they are constantly adding. It is called the "Spell Series," and the latest volume to come to hand is *The Spell of French Canada* by Frank Oliver Call. The exotic and fascinating spell of French Canada with its folk lore and festivals, its history and physical uniqueness is woven into a book worthy to take its place in this already notable group.

Recent Bulletins

Recent bulletins of the Government include: *Long-leaf Pine Primer* by W. R. Mattoon, Farmers' Bulletin No. 1486, five cents; *Maple Wilt* by C. F. Gravatt, U. S. Department of Agriculture Department Circular 382, five cents; *Small Concrete Construction on the Farm* by M. C. Betts and T. A. H. Miller, Farmers' Bulletin 1480, ten cents; *Fishing Industry of the Great Lakes* by Walter Koelz, Bureau of Fisheries Document No. 1001. These can all be ordered from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Gardens and Art

How can one make the most of one's garden? This question is admirably answered by Elsa Rehmann in *Garden-Making,* a delightful volume recently from the presses of Houghton-Mifflin Company of Boston and New York. The answer is in no small measure assisted by the illustrations from photographs by the author's sister, Antoinette Perrett. The author approaches the subject from the point of view of making gardens really artistic. She considers not alone the flowers to be planted but the other touches in the way of furnishings and ornament that add the vital touch to the garden's beauty. This volume should be of distinct value to every garden maker and worth its price of $3.50.

About Poison Ivy

The latest addition to the leaflet series of the Field Museum of Natural History, Chicago, is a distinctly valuable one, dealing with that ubiquitous plant pest, poison ivy. The leaflet, which is written by James B. McNair, Associate in Economic Botany, discusses the plant from the botanical viewpoint, the manner of the poisoning, susceptibility to it and the symptoms of it and closes with suggested remedies and methods of exterminating the plant itself. The leaflet is available from the museum at a price of twenty-five cents.

Helpful References

Requests for citation of authoritative general works on various branches of Natural History are frequently received from our readers. The following list includes some of the best in their respective fields. Some are out of print and obtainable only through libraries or dealers. Other subjects and titles will be covered in future issues.

Fishes

American Food and Game Fishes. By D. S. Jordan and B. W. Evermann. Doubleday, Page & Co., Garden City, New York. $5.

American Fishes (Food and Game Fishes). By G. Brown Goode (New edition 1903, 562 pages, contains addition by Theodore N. Gill). D. Estes and Co., Boston, Mass.

Goldfish Varieties and Tropical Aquarium Fishes. By W. T. Innes. Innes & Sons, Philadelphia, Pa.

Reptiles and Amphibians

A Check List of North American Amphibians and Reptiles. By Leon Lard Stejneger and Thomas Barbour. Second edition. Harvard University Press, Cambridge, 1923.

The Reptile Book. By R. L. Ditmars. Doubleday, Page & Co., New York, 1907.

The Frog Book (Frog and Toads). By Mary C. Dickerson. Doubleday, Page & Co., New York, 1906.

Reptiles of the World. By R. L. Ditmars. Second edition. Sturgis and Walton, New York, 1910.

Vertebrates in General

Manual of the Land and Freshwater Vertebrate Animals of the United States. By Henry S. Pratt. P. Blakiston's Sons & Co., Philadelphia, Pa.

A Manual of Vertebrate Animals of the Northern United States. By David Starr Jordan. A. C. McClurg and Co., 1899.

Our Vanishing Wild Life. By W. T. Hornaday. Maps and illustrations. Charles Scribner's Sons, New York, 1913.

Insects and Other Invertebrates

An Introduction to Entomology. By John Henry Comstock. Comstock Publishing Co., Ithaca, New York, 1924. $6.

The Insect Book. By L. O. Howard, Doubleday, Page & Co., Garden City, New York, 1908.

Field Book of Insects. By Frank E. Lutz. G. P. Putnam's Sons, New York and London, 1918. $3.50.

The Butterfly Book. By W. J. Holland. Doubleday, Page & Co., Garden City, New York, 1908.

The Moth Book. By W. J. Holland. Doubleday, Page & Co., Garden City, New York.

Ants, Their Structure, Development and Behavior. By W. M. Wheeler. Columbia University Press, New York City, 1913.

Nature Study Reader

The long-felt need for Nature readers is at least in part met by an attractive volume published by Macmillan Company, "First Lessons in Nature Study." The author, Edith M. Patch, is of the Department of Entomology of the University of Maine. The simplicity of the vocabulary, clarity of style, and choice of subject matter make the book suitable for the average fourth- or fifth-grade class. Chapter XV, suggesting questions to answer and things to do outdoors and indoors, after reading each of the preceding chapters puts it into the useful class of study readers. The author makes no pretense at a comprehensive treatment of the Nature Study field. What she claims for the book is simply that, "wherever your own home is, you are likely to meet some of the very same plants and animals that are mentioned in this book, which is partly to tell you interesting facts about them, and even more to ask you to look and find out all you can for yourself."

The Panama Canal

Probably one of the greatest triumphs of man over natural obstacles was in the building of the Panama Canal. The achievement was, of course, epic, and the history back of it fraught with the drama of struggle. In 1910, L. C. Page and Company brought out *Panama and the Canal Today* by Forbes Lindsay. It ran through several impressions and is again brought out in revised form through the collaboration of Nevin O. Winter. It is a valuable volume.

Cargoes and Harvests

"Plant power means to a nation what horse power means, or water power, fuel power, sea power, man power and brain power. It is the treasure that buys a nation's independence and supremacy. To obtain it men have gone forth with the sword and conquered neighbors more rich in fertile lands, great forests, precious dye plants or healing herbs. Plant power has made and unmade the boundaries of kingdoms, sent men upon gigantic voyages of discovery, kindled great sciences. Plant power means world power."

This is the opening paragraph of Donald C. Peattie's excellent work, *Cargoes and Harvests,* just from the presses of D. Appleton and Company of New York. As readers of Nature Magazine know, Mr. Peattie writes well, combining the training of a botanist with an all too rare grasp of how his story should be told to the lay reader. In this volume he has presented an alluring story of history and romance as they surround those plants which Nature contributed to man's prosperity. His book is a valuable textbook as well as entertaining reading and would find its place in any well-rounded course in history, geography or botany. Beatrice Siegal contributes some entertaining maps.

American Nature Association

ORGANIZED TO STIMULATE PUBLIC INTEREST IN EVERY PHASE OF NATURE AND THE OUT-OF-DOORS, AND DEVOTED TO THE PRACTICAL CONSERVATION OF THE GREAT NATURAL RESOURCES OF AMERICA

The American Nature Association seeks to find for Nature Study an essential place in every School and in every American Home. It is working for Forest and Wild Life Protection along sane, economic lines. It believes that clean, healthful Out-of-Door Recreation is the key to Good Citizenship

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NATURE CALENDAR

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SEPTEMBER

The young ruby-throats, along with their parents, have been enjoying the blossoms of the trumpet vine and jewel weed.

September 23 marks the beginning of autumn in this hemisphere and the beginning of spring in the Southern hemisphere.

Autumn winds are sowing the spores of puffballs, mushrooms, toadstools, and other fungus growths.

Flocks of wild ducks, going southward, pass high overhead.

One of the last orchids of the season, the ladies' tresses, is now in bloom. It depends on bees for fertilization.

During this month and later, muskrats may often be seen traveling cross-country as much as one or two miles from water.

Already many insect-eating birds are starting south, seeking their food supply at its source of greatest abundance. By the middle of the month the kingbirds will have left, perhaps for Bolivia.

It is ballooning time for young spiders (*Lycosidae*). On silken threads, which they spin out upon the breeze, they sail off until their airy conveyance becomes entangled in the grasses or shrubs of distant fields.

Nature's mighty sower, the wind, is scattering winged seeds in countless numbers.

The business of making winter quarters now concerns the larvae of many moths and butterflies. Some of them already are snugly spun into silken cocoons.

The brown leaves of the woodland thickets and undergrowths rustle and stir with flocks of sparrows, juncos, and towhees.

A walk afield makes one a seed-bearer. Burrs and stick-tights need very little if any persuasion to hook a ride.

Wild gardens are featuring goldenrods and asters with striking prominence.

THE HUMMING BIRD

"The sunlight speaks, and its voice is a bird:
It glimmers half-guessed, half-seen, half-heard,
Above the flower bed, over the lawn. . . .
A flashing dip and it is gone,
And all it lends to the eye is this—
A sunbeam giving the air a kiss."

—*Harry Kemp.*

The sweet plaintive call of the fall minstrel, the white-throated sparrow, is a delight to hear.

Autumn tints are staining the foliage. Poison ivy is among the first plants to assume attractive brilliant colors.

Overhead at night you may hear the loud metallic calls of olive-backed thrushes as they migrate southward.

Young mule deer have donned their unspotted bluish-gray coats. Although weaned, they stay close to their mothers.

Mother Coon now gives up hunting frogs and leads her May-born youngsters into the fields for a taste of corn.

Such of the Pacific salmon as have escaped the seals and sea-lions at the river mouths and fisheries farther up are laying their eggs hundreds of miles from the ocean. Spawning in some places will continue until December.

At this time of year many a roadside or waste place is brightened by the "heavenly hue" of the succory, or chicory, one of the most beautiful blues in nature.

The spicebush is now a lunch counter for many birds. They also like the brilliant fruit of the pokeweed.

Mother Black Bear, with one or two roly-poly cubs, has been feasting on blueberries and hunting bee-trees. They are now looking forward to the wild grapes.

The full moon nearest the fall equinox is the Harvest Moon. It rises each evening only 18 to 25 minutes later than the day before, thus making long evenings in which to finish the harvesting.

The two stars, one blue and the other gold, which make up the double star Albireo at the foot of the Northern Cross, can be easily seen through a small telescope.

Prepared for NATURE MAGAZINE by the Cleveland Museum of Natural History

"DON Q" HIMSELF

California quail and son of the wild though he may be, he has a definite personality and individuality.

Nature Magazine

Vol. VIII SEPTEMBER, 1926 No. 3

There is a ghost in winter wind;
But nobody can hear it cry,
Save him who bruises wantonly
A thrush, a rose, a willow tree,
Or breaks a butterfly.
—Lew Sarett.

THE STORY OF "DON Q"

By Irene Finley

(PHOTOGRAPHS BY WILLIAM L. AND IRENE FINLEY)

This is the first episode in the remarkable life of "Don Q" the California quail, a distinctive and distinguished member of the Finley family.

Next month we will travel with "Don Q" across a great continent. He was the strangest passenger that ever a green plush Pullman coach has carried.

TWO CHILDREN sauntered along an old wood road that wound down the hill under the trees toward the river. This quiet hillside had been their home all their lives. Something fluttered from under the boy's foot and disappeared at the base of a tree.

"It's a baby bird!" whispered his sister. "Watch out, you'll step on it!" she warned, as the boy jumped quickly after it, reaching for the brown bit of down that wavered along ahead.

"I've lost it," he said, "and yet I know where it stopped. I'm afraid to move around because I might step on it. I'll bet it's under that leaf right there." He threw a little twig down in front of him. The mottled leaf jumped up and ran for another spot to hide away.

"Catch it, or it'll turn into a piece of bark or something," exclaimed the girl.

"It's moving toward that old log," whispered the boy. "And there's another one crawling through the grass."

In two jumps he was there, only to see one and then the other flitting form disappear under the log, so old and mossy that it was half embedded in the ground and overgrown with a tangle of vines and ivy.

"They'll stay under this log for a while, and I'm going to stay with them until I get at least one," avowed the boy. He soon

AT THE TENDER AGE OF ONE DAY

Orphaned almost at birth, young "Don Q" entered upon a strange career in which men, not quail, were his fellows.

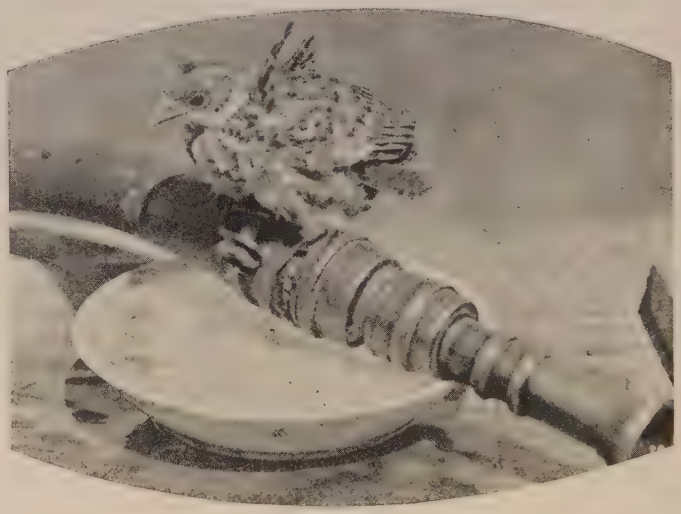
GOOD TASTE IN READING MATTER

"Don Q" and his favorite magazine, in which his own story is now appearing serially.

made out a brown blur flattened into the shadows, but when he stooped down it faded out of reach. Around the end of the log the children cornered it. It squirmed through their fingers several times. It was so tiny and soft they didn't dare squeeze it hard. A little later they captured its twin, which peeped frantically at being enveloped in a big hand.

But the boy and girl did not know that not far below them on the hillside a mother quail was hurrying the rest of her frightened brood of day-old chicks off into the underbrush. The quail family had been taking their first outing in the spring sunshine when the alert mother bird had caught the children's footsteps on the road. "Kr-r-rt! Kr-r-rt!" had sounded the danger signal. Like blown leaves the quail babies scattered and dropped here and there as still as the twigs and moss on the ground.

There were noise and excitement for a few minutes, and then all was still again. The mother called her children, and they rose up from the ground like little ghosts and followed her, peeping plaintively. But when the little group was collected, two were missing, and by this time their mother was far out of hearing of their frail voices. Nor would she come back, for she was working beyond to a sunnier feeding ground where the wild grasses grew lush, providing a bountiful seed supply. The wanderers she left behind.



AT THE DISHEVELED AGE

On the top of his head was a tiny patch of fuzz which stuck up in a foolish way.

"These are ground birds all right," said the boy. "They look about a day old, and yet they are covered with down and can run fast. I think they are young quail," and he snuggled them down in his pocket.

The children hunted for some time for any sign of a nest under old logs, in the leafy hollow places at the roots of trees, but it was too difficult a task to find the secret of the woods folks. Then they sat down to wait. Perhaps the mother would return to find her lost chicks. But the silent woods brought no anxious call from a mother bird.

The children hurried home. In the study of their house they put the two quail in a good-sized box with a screen over the top. In one corner the boy put one of his old wool caps which he thought would make a warm nest. A little box of fresh dirt, a saucer of water, some hard-boiled egg and a couple of ripe strawberries completed the children's offerings to the orphans.

But the little quail would have none of it. Things were too big and strange and awful. They huddled under the wool cap. It grew late and they were hungry, but their food remained untouched. The boy and girl watched them anxiously. They looked cold and miserable. Finally the girl brought in an electric reading lamp and placed it where the light and warmth shone down on the lonely quail. Soon a small brown form crept close to the warm bulb and fluffed out his feathers. The other followed, and they began to peep softly of their comfort in the heat of the electric lamp. They livened up and began to notice things. One of them pattered out on the floor and picked at a yellow spot and found it good to eat. It was egg yolk and, although new to him, he ate three crumbs of it before he stopped. Then he hurried back to preen contentedly before that glorious comforter, the light. This glowing mother had made life worth while again.

Each day the little quail grew more like animated

FOUND—A WARM HUMAN NEST

He crept into the hand and nestled in this strange home, the first of many new experiences.

puff-balls. They scurried about, investigating every corner of their box, and stretched up on their tip-toes to peck at every spot on the walls. It might be good to eat. And how quick they were! Like flashes they launched across the floor to pounce upon a brown miller almost as big as they were. If their antagonist waved his wings too fast, their own pinions burred faster and lifted them into the air in momentary excitement, only to settle down and attack the monster more vigorously. These bouts with big cut-worms, bugs and stiff-legged grasshoppers sharpened the edge of their hours. After a particularly hard battle of this kind, one would stop in the middle of the floor, his head bend lower and lower, and he would drop to sleep till he toppled over on his nose.

And so it went in the quail nursery. The chicks were mottled-brown, ragged little fellows that had become flying balls of energy and eagerness. The larger one was bright-eyed and bold and by this time showed two scraggly feathers in his runty tail. He pitched into a red strawberry and ate till his face was pink clear around to his ears. Then he bent down and vigorously wiped his bill on anything handy, and scurried on to discover something else.

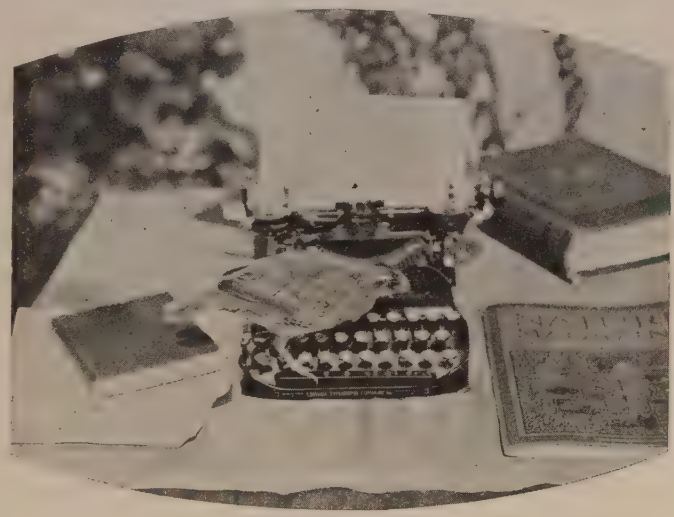
The chicks were growing in quail wisdom. Everything that moved or any sudden sound was a sign of danger, and they involuntarily started up and away for cover. Then they flattened close to the ground and watched from the corners of their eyes. If the door of their house was left ajar the least bit, they were always ready to squeeze through and run. One day both of them slipped out. They were more fleet-footed and wary now, and after a long hunt through the flower garden the boy and girl captured only one.

The little quail that was left was wild with loneliness and longing for his companion. He stood in the middle of the box, stretched up on his tip-toes, and called to his lost brother in all the alluring wild notes that only a bird of the woods and fields can utter. All day he was restless and called at intervals, straining to hear the answer of the one who had left him. At night he settled down to a fitful, complaining murmur. The children tried to help him, so they opened his door. He wanted to come out into the room, but didn't quite dare. After a while he ventured across the threshold, but fear seized him and he darted back. By evening he had fortified himself enough to walk out on the carpet, though he stepped gingerly. The children sat still and talked to him. So little he was away down there on the floor, with all the big desks and chairs towering above him! To look up into their eyes, he had to stretch his head away back. He walked around with a ruffled, uncertain expression, eluding every effort to comfort him. Finally the boy sat perfectly still and the little quail, at his wits' end, flew up to his knee and fidgeted around in a half suspicious, half pleading way. The boy rounded his big hand into a cup and held it out. The little quail eyed it for a minute, then crept into it as if it was a warm nest, snuggled down and fluffed out his feathers, shut his eyes and went to sleep.

This began a new and strange period in the little quail's life. He gave himself wholly to his human friends. There were no reservations. He took all the joys that came with the change. He

FORAGING FOR PERIODS

He delights to wander over printed matter, pecking at punctuation marks as he goes.



A BIT OF TYPING TO DO

"Don Q" is a literary bird, and the typewriter was an early experience in his life, fascinating him.

THE LUXURY OF A BATH

Despite his human associations, he held to the sand ablutions of birddom and quaildom.

cuddled and peeped contentedly and talked in his sleep. And he slept soundly, for all his troubles were over.

From now on, his days were a succession of happy companionship. More changes came over him. The pattern of his dress became more marked brown and the down was disappearing. There was a queer, unfinished look about his head, down the top of which was a rich, brown stripe a quarter of an inch wide. He had a disheveled appearance like a boy who will soon be at the age of shaving. And right on the top of his head was a tiny patch of fuzz which stuck up in a foolish way. Sometimes this wisp bent forward and sometimes back, as if it didn't know exactly which way it would lean in the end. The boy and girl had been trying to discover a top-knot on his crown for some time, but could hardly believe this doubtful sprout could develop into the jaunty plume of a California quail.

ABOUT TO TAKE OFF IN FLIGHT

He is a restless chap, constantly in search of something new to investigate.

Indeed, most anything could be expected of the little quail these days, for he was developing so rapidly into a real personage. He flashed here and there to slide and skid on the polished floor. To the top of the desk he curved, walked too near the edge, and slid off on the papers below. Here he found some newspaper clippings and began to pull and tear them. He tore off a sliver. It was good to eat, of course, so it started down like a long worm and went to make beautiful feathers of black and blue and buff.

The girl was writing when the little busybody walked demurely over her letter. He cocked his eye at the inky marks, then worked industriously to pick up a comma, twittering cheerily all the time. It must be a bug. When it wouldn't come loose, he began to scratch vigorously. All at once he lowered his head and went on a chase after the scribbling pen. Anything that moved must be investigated.

Then he flew off and landed on the typewriter, and, stepping high, went clicking up and down. As he hopped upon the carrier, the boy began to clatter the keys, and he rode back and forth on the carriage, getting more excited and pleased every minute.

"Isn't he a regular little strutting cock!" exclaimed the boy.

"Yes, he's Don Q, the little troubadour!" said the girl.

DO WOODCHUCKS CLIMB?

THIS IS a question that had been debated at length by the Nature lovers of Suffern, New York, for some time, writes C. A. Beck. There were claims on one side that the woodchuck never adopted the small boy habit of shinning up a tree, while on the other hand various claimants declared that with sufficient provocation, such as the vociferous barking of a dog, the woodchuck would take to a tree.

This was amply proved one day when several dogs discovered a woodchuck and set after it. The little animal spied a handy tree, and up he went, getting to a good, safe height. Mr. Beck writes that he raced a half-mile for his camera in order to get the positive evidence of this climb, and finally got back before the woodchuck had slipped all the way down to the ground. In the interest of fair play and friendship for the terrified little animal, the dogs were held, and the woodchuck scampered away safely, having well earned his security.

PHOTOGRAPH C. A. BECK

THE WOODCHUCK SEEKS SAFETY

Spurred by the barking of dogs the animal forsook the ground for safer heights.

HERE IS THE EVIDENCE

It is not common, according to those who have been much in the woods, to see a woodchuck up a tree, although, as in the case of the Suffern woodchuck, a dog will inspire it to heights of climbing. Mr. Edward A. Preble tells us that not long ago he saw a woodchuck climb a smooth, unbranched trunk for about thirty feet to escape a dog. It is believed that occasionally the animal will climb a low tree of its own accord, but, as a general rule, the inspiration of self-preservation is necessary. Then, in his need, the animal has recourse to that useful habit of the squirrel family.

HARMONIES OF NATURE—COLOR

By H. W. Shepheard-Walwyn

(ILLUSTRATED BY R. BRUCE HORSFALL)

THERE are other harmonies in Nature besides the more obvious Harmony of Sound—one at least of which has won its way into general recognition under the title of camouflage. The principle of camouflage was brought very much into the limelight during that stupendous conflict which recently convulsed the world and turned the pleasant pastures of Europe into a reeking shambles. Could anyone ask for more convincing proof of the value of Nature's counsels, than that Man at his wits' end should find himself forced to borrow a leaf from her book of precepts? In modern warfare the battle is one of wits, and he who can first contrive to outwit the other is the one who takes the odd trick.

And a very odd trick it certainly appeared at first—painting the roofs of ammunition factories to resemble woods and cornfields, disguising merchant ships with fantastic devices to deceive the eye, concealing big guns in faggot-stacks and listening-posts in imitation hay-ricks! Yet countless were the instances in which it was an odd trick such as these which alone availed to score the odd trick in that historic contest. And the doffing of the scarlet uniforms in favor of khaki was not the least accomplishment.

Everyone patted Nature on the back, and wondered why on earth no one had thought of it before. And poor, patient Nature, who spends a great deal of energy in advertising precepts to which no one pays the least attention, but unfortunately has not the power of answering back, could only point wistfully to the myriad instances in which her own children daily and hourly owe their lives to this self-same principle.

The Harmony of Color, it may be translated into the vulgar tongue. Nature has ever been a past master in the art of harmonizing. How comes it otherwise that the colors of wild flowers never clash? Wild flowers, that is, for naturally one could not include the extraordinary mixtures sometimes arranged in the garden by man. But I have seen a sky-blue speedwell growing in the very pocket of a magenta knapweed, with a scarlet pimpernel at their feet, and there was nothing in that preposterous scheme of color to offend the eye of the most susceptible—but only because Nature had done it. If my young daughter were to make her appearance at the breakfast table in a magenta blouse with a sky-blue skirt and scarlet stockings, I should promptly send her back to bed and phone for the doctor. I am inclined to think that we might both require his attention.

"THE YELLOW BUTTERFLY CHOOSES THE YELLOW BUTTERCUP"

The Harmony of Color admits of no explanation. It is wholly beyond argument—wholly beyond criticism. You could never explain *why* the combination of blue speedwell, scarlet pimpernel and magenta knapweed does nothing to outrage your sense of harmony in color—you only know that it does not. Just as you know instinctively that the spectacle of a blue skirt with a magenta blouse and scarlet

stockings would make you feel positively very sick indeed.

Certainly Nature needs no teaching how to exploit this principle to the best advantage. We have just seen how harmony can exist in violent contrast—the whole point is whether the general effect of any given combination is calculated to strike a sympathetic note in the mind of the beholder. Our English word harmony is derived from the Greek "harmonia," which means "fitting in" or "agreeing with." A more violent contrast, for instance, than a golden buttercup in a plot of green grass would be difficult to conceive, but the combination of the two happens to agree perfectly with one's sense of fitness. In other words, you expect to see the buttercup on your lawn—you have done so all your life—and consequently there is nothing incongruous about the spectacle. The discovery of a hollyhock or a vegetable marrow growing in the middle of your lawn would affect you very differently. In a word, then, harmony might be defined as—the effect produced upon the mind by finding what it expects to find. That which is expected automatically becomes harmonious. If I were to array myself in a cassock and surplice and take up a position in the middle of a bed of scarlet geraniums, the contrast—in this case the discord—produced would be so violent that not a single wild bird or beast would venture near the spot. Were I to remain sitting there motionless for a week or two, however, the birds and mice would be hopping all over me and perhaps even nesting in my pockets. Habit would have effected the conversion of discord into harmony.

"THE BURNET MOTH MARCHES BOLDLY UP STEMS OF GRASS"

Let us see for a moment how the principle of camouflage is followed in the realms from which the idea originally sprang. The brilliant-yellow brimstone butterfly is proverbial for his partiality towards yellow flowers—where his instinct tells him that he will be far less conspicuous than would be the case amongst those of blue or crimson coloring. Perhaps one of the most remarkable instances is that of a certain charming little fellow that goes by the name of the "Green Hairstreak" butterfly. The upper surface of the wings are blackish-brown in color; the undersides, on the contrary, an intensely vivid leaf-green. It should be mentioned that a butterfly invariably folds the wings close upwards when resting, thus leaving the under-surface alone exposed to view. Consequently the Green Hairstreak, conspicuous enough while flitting here and there among the hedges, has only to alight upon a green leaf for his green under-surface to render him instantly invisible. I have seen the sharpest-eyed people stand and stare at one of these butterflies for several minutes, and be forced to give it up in the end.

Some have no doubt seen pictures of the famous Indian butterfly that imitates a dead leaf, even to the actual stalk and the veins upon its surface. I once photographed a group consisting of a pair of caterpillars giving their celebrated impersonation—as they say in music halls—of the twig of a hawthorn. This photograph shows what you would take for a bare twig, terminating in three prongs a couple of inches in length. Actually, however, it is the middle prong alone that belongs to the twig, both the others being living caterpillars stretched out at full length in their natural resting position. Each of their heads is cleverly tapered to resemble the outlines of a leafbud, while the six forelegs are folded tightly together and stuck out at right angles in imitation of a thorn. So complete is the deception that it would be necessary to take hold of the twig with finger and thumb before one

could discover the hoax. In these we have what I will, for the sake of distinction, describe as instances of direct harmony—objects which actually match their surroundings. Another kind of camouflage finds expression in deliberate violation of the general scheme of coloring—and yet, as in the case of a buttercup on the lawn, proves none the less harmonious on that account. Remember the definition of harmony—"the effect produced upon the mind by finding what it *expects* to find." And this is a point where Nature has to be very careful. We all know how a single false note in a beautiful piece of music will jar upon the sensitive nerves of the listener—becoming for the moment the most conspicuous thing in the whole piece. It may possess an exquisite tone individually, but it breaks the harmony of the rest of the theme. Well—suppose that this false note were something alive, something that depended for its very existence upon its ability to harmonize with the rest of the scheme?

At the same time, one must remember that there are occasions in music when a discord is not only permissible, but will actually enhance the completeness of the general effect. No less is this the case with the Harmony of Color. Nature has always been very much alive to the value of discords in her harmonies, but there is only time now for a single instance—and I have chosen that of the beautiful "Burnet" moth in its earlier stages. Instead of following the fashionable custom of burying itself in the ground or hiding between two leaves, when ready to assume the chrysalis state, this caterpillar proceeds to march boldly up a prominent stem of grass, selects the most prominent part of the stem, and there encloses itself in a prominent cocoon of the most prominent color it can think of. Glittering gold or silver, to be exact. And there it composes itself to sleep—dozens of them—scores of them—hundreds of them very often—gleaming like brilliants in the sunshine—exquisite little drops of discord in the harmony of a quiet English meadow.

Positively asking for trouble, you would think! What is to prevent the birds that swarm on every side from ripping open those long boat-shaped cocoons of shimmering silk, and making merry with the defenseless creatures within? They cannot pretend that they do not see them. They certainly do see them. The whole point is that they *expect* to see them. They *expect* to see a broad stretch of tall waving stems loaded with conspicuous seedpods and grassheads, and, if there should happen to be a few hundred equally conspicuous *make-believe* seedpods and grassheads thrown in—why, the more the merrier, and how could a little bird be expected to know the difference?

I would ask you to notice the remarkable illustration that we have here of the power of inherited instinct. The Burnet caterpillar cannot possibly *know* that its cocoon will be the same shape and color as the ripe seedpods—so that it can be nothing but blind obedience to its instinct which leads this particular species to transgress the ordinary laws of the caterpillar kingdom by establishing itself in such a conspicuous position.

This question of inherited instinct is one of absorbing interest. Even in the case of animals domesticated for countless generations, we find it occasionally peeping out. When my great-uncle—a tall and stately Anglo-Indian General—trod upon a cat and came to earth like a young avalanche, it was purely because the cat was black and had taken a fancy to ensconce herself upon a black mat. The "brass hat" took the black cat to be part of the black mat, and the shock of his rapid descent was in no way mitigated by the fact of there having obviously been no malice aforethought on the part of the cat. That animal's choice of position must be regarded as nothing more nor less than an echo of the days when her ancestors owed a great measure of their safety to the efficiency of their protective coloring. Compare this with the habits of her relations in tropical jungles—jaguars and the various other species of tree-cat, whose speckled coats provide a faithful imitation of rays of light filtering through the foliage as they lie stretched out upon the branches of their native trees—from which we see that it is not only in what one might call the "underworld" of Nature's kingdom that the value of this principle is realized. Even lions are not above profiting by their resemblance to the yellow sand on which they crouch when stalking their prey—thus showing that the very King of Beasts himself can add new testimony to what Nature has achieved with the Harmony of Color, and what man can learn from her.

PHOTOGRAPH BY CORNELIA CLARK

MR. AND MRS. BILLY RABBIT AND THEIR NINE CHILDREN

PHOTOGRAPH BY G. A. CLARKE

THE REAL RAINBOW

The photograph shows primary, secondary and supernumerary bows. What painted rainbow ever rivaled the beauty of this photograph?

THE LORE OF THE RAINBOW

By Charles Fitzhugh Talman
Of the U. S. Weather Bureau

THE RAINBOW, like the nightly pageant of the stars, is a spectacle that everybody looks at but few really observe. Ninety-nine people out of a hundred retain but the vaguest impression of this beautiful meteor, which they have seen at frequent intervals throughout their lives. Strange to say, this statement applies even to painters who put rainbows into their landscapes and writers who put them into poems and romances. To cap the climax, there are accounts of the rainbow in scientific literature that indicate extraordinarily limited powers of observation on the part of the authors.

The principal physical facts about the rainbow are explained, with appropriate diagrams, in hundreds of easily accessible books. Its complete scientific explanation, which is far from elementary, will be found in works on optics. One of the clearest is that given in Preston's "Theory of Light." For our present purpose only a small part of such information needs to be summarized.

Drops of water and a source of bright light—generally the sun or the moon—are the things essential to the formation of rainbows. The rainbows with which we are most familiar are formed by falling raindrops, but bows are also seen in spray, fog and elsewhere. The diagrams in the school books show how light is reflected, refracted and separated into the different colors of the spectrum in passing through the drops. While the light enters and leaves the drop by an infinite number of different routes, there is, for certain geometrical reasons, a concentration of light in a particular direction, and this direction is somewhat different for the different colors. This concentrated light is all that we can see, and it gives the rainbow its definite angular size.

Let us now, for the moment, confine our attention to bows formed by the sun in raindrops. The bow is an arc of a circle whose center is directly opposite the sun. You must stand with your back to the sun to see the rainbow, and the lower the sun the more of the bow visible above the horizon. The radius of the ordinary or primary rainbow at its outer edge is about forty-two degrees. Hence when the sun is more than forty-two degrees above the horizon, the rainbow is entirely below the horizon and invisible. Thus in our

latitudes we can never see a rainbow in the middle of the day in summer. From the above facts it follows also that the visible part of the bow is generally less than a semicircle, and never more unless we view it from some lofty location.

Besides the primary rainbow, we can generally see a secondary bow, concentric with the primary and having a radius of about fifty degrees. It is always fainter than the primary and the space between the two bows is, as a rule, conspicuously darker than the rest of the sky. The latter point deserves emphasis, because it has been overlooked by most painters of rainbows. Additional bands or fringes of color, chiefly red and green, may often be detected adjacent to the inner edge of the primary bow (as seen very plainly in the accompanying photograph by Clarke), and, much less frequently, along the outer edge of the secondary. These are known as supernumerary bows.

There are also certain rainbows caused by three or more reflections of light inside the drops—known as the tertiary, quaternary, quinary, and so on—which are rarely, if ever, seen in Nature, though they can easily be produced in the laboratory.

COURTESY DR. J. W. FEWKES

THE RAINBOW PERSONIFIED

Here it is shown as a measuring worm, one of several serpent-like forms ascribed to it by the American Indians.

Last, but not least in interest, some additional bows may occasionally be seen when a smooth sheet of water is at hand to serve as a mirror. The image of the sun formed on such a surface may produce a bow or a pair of bows rivaling in splendor those produced by the sun directly. On account of the low position of the source of light, the "reflection" bows, as they are called, will be higher in the sky than the ordinary rainbows formed at the same time, and will generally intersect the latter. Indeed, if the sun is high in the heavens a reflection bow may be lifted entirely above the horizon. It will then form a complete circle, or, if only part of a circle is visible, it may be the lower part, giving us the strange spectacle of a rainbow upside down! A water surface may also show a reflected image of the ordinary rainbow, as formed in the sky by the sun, and cases have been reported in which the reflection bow, described above, has

A RAINBOW BY RUBENS

Compare this hard-looking and strangely distorted bow with the bow shown in Clarke's beautiful photograph.

PAINTING IN THE WALLACE COLLECTION, LONDON

likewise been seen reflected in the water. A remarkable occurrence of this kind was described some years ago in an English scientific journal when eight rainbows were visible at once; the ordinary primary and secondary bows in the sky, their reflections in the water, primary and secondary reflection bows in the sky, and the reflections of these bows in the water. Careful observation would, in all probability, have revealed one or more supernumerary bows in addition to the eight bows reported.

FROM "NATURE," OCT. 1, 1874

INTERSECTING RAINBOWS

The fragmentary bow at the left is a "reflection" rainbow, formed by the image of the sun in the water.

Besides these various bows formed by the passage of sunbeams through raindrops, there are the brilliant bows formed in the spray of fountains, cataracts and ocean waves—to say nothing of lawn-sprinklers; the pale bows sometimes seen in fog; and the uncommon horizontal rainbows formed over a dew-covered field, or on some other horizontal sheet of water-drops below the level of the observer's eye; as, for example, fog droplets deposited on the floating scum of a lake. To complete our catalogue of rainbows we must mention those formed by the moon. They are generally too faint to show any color, but a bright bow formed when the moon is near the full shows colors quite distinctly.

This brings us to a subject concerning which a great diversity of opinion has always prevailed—the colors of the rainbow. As to the number of colors, the range of ideas may be illustrated by quoting from two of the major English poets. Tennyson writes:

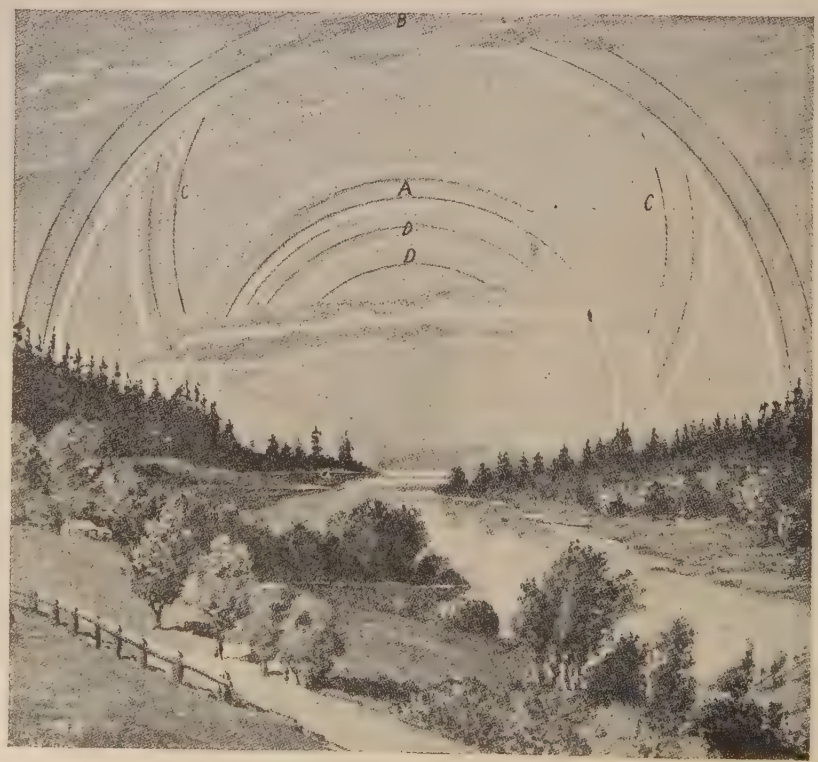
O trefoil, sparkling on the rainy plain,
O rainbow with three colors after rain,
Shine sweetly; thrice my love hath smiled on me.

And Shelley:

The triumphal arch through which I march . . .
Is the million-colored bow.

Milton and many other well-known writers agree with Tennyson. We read in "Paradise Lost" of "the triple-colored bow." Shelley's exuberant description is a unique example of poetic license, but at least two of the Latin poets—Virgil and Ovid—ascribe a thousand hues to the robe of Iris, goddess of the rainbow.

In serious literature, scientific and otherwise, it has been customary to assume that there are seven colors in all manifestations of the solar spectrum, including the rainbow. A pure spectrum actually shows an indefinite number of color gradations, but for the sake of convenience Sir Isaac Newton enumerated seven "primary" colors, occurring in the order violet, indigo, blue, green, yellow, orange and red (a sequence that may be fixed in one's mind by means of the mnemonic word *VIBGYOR*). The selection of seven colors was probably influenced by the symbolical importance formerly ascribed to this number, and the inclusion of indigo shows that this plant and the corresponding color were much more prominent in Newton's time than they are today. The list, however, still holds its place in the books of science, but it is not properly applicable to the rainbow.



FROM A. TISSANDIER, "L'OCÉAN AÉRIEN"

A COMBINATION REPORTED FROM SWEDEN

***A* is the primary rainbow; *B* the secondary; *C* a primary reflection bow; *DD* are supernumerary bows.**

As a matter of fact, the colors of the rainbow are quite variable, though the order in which they occur, so far as visible, is necessarily that of the spectrum. In the primary bow the inner (lower) border is violet and the outer (upper) red. In the secondary the inner border is red and the upper violet. Thus, reading either up or down the colors bordering the two bows run in the order VRRV (a group of letters easy to retain in your memory—even if you are not a radio fan). These two colors can nearly always

be distinguished, though they occur in various shades—especially the red, which ranges from scarlet to terra cotta—and between them it is usually easy to make out at least one other color. Greens, blues and yellows may all be present. There is, however, much mixing of colors, because the rainbow is not a single spectrum but a series of overlapping spectra formed by light coming from different parts of the broad solar disk. Rainbows vary in breadth as well as in their colors. The narrowest and most brilliantly colored bows are produced by drops of the largest size, such as the rain of a retreating thundershower. The broadest and least distinctly colored bows are produced by very small drops, such as those of a fog, which give us the so-called "white rainbow," or "fog-bow."

A red sun at sunrise or sunset sometimes produces a rainbow in which no color but red can be seen. Red rainbows have been regarded by superstitious people as portending war.

Among the well-founded weather saws is that which runs:

A rainbow in the morning
Is the shepherd's warning;
A rainbow at night
Is the shepherd's delight.

Assuming that "night" here refers to the late afternoon and that the lunar rainbow is not meant, the saying is justified for the following reasons: We see the rainbow where rain is falling, while the sun is shining—that is, fair weather prevails—in the opposite part of the sky. Our rainstorms usually come from the west and pass away to the east. A morning rainbow can only be seen in the west, and indicates that rain is approaching us. An afternoon rainbow is seen only in the east, and shows that the rainy area is receding from us, giving place to clear skies.

Wordsworth's heart leapt up when he beheld a rainbow in the sky. The present writer's sank when, some months ago, he espied a colored picture of a rainbow displayed in a Washington street-car advertisement. No longer are we a law-abiding nation—even the laws of optics are now flouted in the strongholds of democracy! The law-breaking artist in this case had not only "added another hue unto the rainbow"—or rather several of them—but he had arranged the colors in an order unknown to Nature. This is not, however, quite the worst rainbow "bull" we have ever encountered, for the Weather Bureau Library contains an early German treatise on meteorology—Reinzer's "Meteorologia philosophico-politica"—in which there are four pictures of the rainbow, all of which show it on the same side of the sky with the sun!

FROM F. REINZER, "METEOROLOGIA," AUGSBURG, 1709

"WHAT'S WRONG WITH THIS PICTURE?"

One of *four* in the same book showing the sun and the rainbow on the *same* side of the sky.

Though the great masters of painting have not taken such excessive liberties with the rainbow, they have rarely painted it successfully. There is a golden opportunity for some artist to specialize in the faithful portrayal of this lovely offspring of showers and sunshine, which is too delicate and ethereal to need any "idealizing."

The folklore of the rainbow is rich and varied, though apparently not well known. By far the largest collection of information on this subject is that given in the ten volumes of the defunct French journal *Mélusine*. Among primitive people the belief has widely prevailed that the rainbow sucks up water from the earth. It has, accordingly, been described and pictured as a serpent or dragon slaking its thirst at lakes and streams. The Indians of our southwest share this notion, and hold the rainbow in abhorrence because it is supposed to be responsible for the droughts with which they are much afflicted.

Local tradition ascribes various other misdeeds to the rainbow. It is said to blight the crops it touches and to bring misfortune to the inmates of a house over which it is seen. Another widespread idea is that if you point at a rainbow your finger will be cut off, or you will be struck by lightning. In France and elsewhere the children have a number of rhymes and charms for driving the rainbow away.

Various things besides the proverbial pot of gold are said to be found at the foot of the rainbow. The Irish say that a gold watch is buried there; the Greeks a gold key; the Norwegians a jug and spoon; and so on. "Rainbow gold" is not wholly mythical. In Germany the washing of the soil by a rainstorm has sometimes brought to light curious gold and silver coins of pre-Roman origin, known as *Regenbogenschüsselchen* ("rainbow dishes"), which popular tradition has identified with the buried rainbow treasure.

One of the prettiest of rainbow myths is that which Nokomis relates to Hiawatha:

'Tis the heaven of flowers you see there!
All the wild flowers of the forest,
All the lilies of the prairie,
When on earth they fade and perish
Blossom in that heaven above us.

Apparently this idea was Longfellow's own invention.

FROM AN ETCHING BY THE AUTHOR

THE GOLD OF RAINBOW SLOUGH

The Gold of Rainbow Slough

BY R. BRUCE HORSFALL

HIS SHOES tied together with their own strings and slung over one shoulder, a small boy trudged along the muddy shore of Rainbow Slough.

At each step the black soil oozed up in curly ribbons between his toes while the hard-pan a few inches below made walking slippery and treacherous, but this was preferable to the higher slope where the saw grass grew—the grass with serrated edges which cut like knives. It had already left several stinging slashes on his ankles and legs below the reach of his rolled-down trousers.

It was hot mid-day in early August. The air shimmered in a misty haze; not a breath of wind stirred the surface of the pond which lay placid in the steaming heat. The zing of countless insects and the hum of bees and flies filled the drowsy air. The stench of rotting vegetation and drying mud mingled with the odors of growing plants, freshly cut marsh grass and water lilies, assailed the boy's nostrils. But he, keenly alive to the eternal fitness of things, thoroughly enjoyed every whiff as he recognized the well-known odors in ever-varying intensity.

There was the spicy tang of the pennyroyal, tansy and other marsh flowers; the suffocating tendency of the summer compositae, the pungent sweetness in the odor of the horsemint; and the overpowering perfume of the white pond lilies, so alluringly lovely but just beyond his depth out there in the water. However, he was not after white lilies, nor did he pick the lovely marsh mallows as he passed along, well knowing that they would droop and wither before he could get them home. They were so beautiful where they were! Neither did he pick the spikes of cardinal flowers, brilliant against their background of black mud or green grass.

This small boy had but one purpose in mind, and to have a purpose is to be all conquering, to win through to a goal.

He was after gold—yes, yellow gold—the gold of the lotus, and his nose told him while yet a mile away that they were in bloom and awaiting his coming. At times, their intense and wonderful odor was contained in pockets of the heavy air in almost unalloyed purity.

He would get them, a big bunch of them—yellow lilies for his mother. He was tired now, yet knew it not. He had come a long, long trail since eight that morning; fully nine miles—seven of them lonely miles beyond the last house.

Anyone might have wondered what so small a boy was doing so far from home, for he was undersized, although it was twelve in his round of years. But his was a self-reliant nature and he had a purpose. What mattered that he had underestimated the time necessary for the journey; there had been so many interesting things to see.

At noon he had rested and drank at a most cooling and refreshing spring under an overhanging cliff where he had often been before with his older brothers. The rest of the way was strange; yet he had unerringly left the railroad and hills at the right spot and struck out across the wide intervening river bottom to the lily pond.

He had been there before via boat and the river route, so he knew when he came to the winding slough that he had found the right place.

He took off his clothes, tied them in a bundle, then held shoes and all upon his head and waded in.

Halfway across, a momentary fright overtook him as the water weeds gripped about his legs, but only for a moment. Quickly turning on his back he kicked loose, and thus swimming above the weeds, though without the use of his hands, was soon on the other side, and took up his line of march to where the lotus grew.

Anon he stopped to admire the beauty of Argiope, the garden spider, whose web strung across his path; gently

frightening her into the pendulum swing common to these spiders when disturbed. Epeira, the orb weaver, he gently coaxed out of her resting place in the curled-over leaf above. These wonderful webs he carefully avoided, stopping only to leave a grasshopper or other large insect as a token of good-will.

Midway of an open muddy slope his eye caught a movement in a disc of black about the size of a dinner plate in the water's edge. Going closer, he discovered a father catfish in charge of his multitude of babies. They were milling round and round while the father guarded just outside in the deeper water. He thought the little bullhead was the mother and did not learn until years later that it is the father who takes sole charge of the eggs and young.

While he watched, a small rock bass stole up to grab a baby and was promptly chased away by father bullhead, but at once another bass stole up from the other side, snatched one and made his safe getaway. Thus these two marauders took turns from one side or the other until the distracted father knew not which way to turn.

Fascinated, the small boy watched, his sympathies wholly with the catfish but powerless to help. He knew that the baby multitude had already dwindled to one-half of its original size and would continue to dwindle until only a thin line along the shore in the shallowest of water would remain. It is ever so in the life of the wild, and our young friend, recognized this, and though loath to leave the tragic spot, wended his way.

At the lotus bed he wandered entranced from flower to flower, quaffing the sweet odor from each before plucking it and marveling at the blossom that could draw such a wealth of sweetness from the stickiest and blackest of mud. The young and as yet unopened blossoms had the finest fragrance, and of these he picked a dozen—a fair-sized bouquet—wrapped a cool lily pad or two about their stems, then tied the whole together with wythes of young willow. Reluctantly he turned away from the entrancing place.

He paused again to look at father catfish and his babies and thought that, even in the short space of his trip beyond, the little black wriggling disc was smaller. Yet tarry he could not; the afternoon was now well spent. He was far from home and knew it.

At the place where he had previously crossed the pond, the problem arose of how to get the heavy bunch of lilies over. He needed both hands to hold his clothes upon his head, and to add the burden of lilies would have sunk his head too low in the water. The lilies must be towed, yet he could not spare a hand to hold them. What was he to do? Ah! he had it, a towing rope of braided grass—just the thing. In a few moments he had a loop of the improvised rope about his arm; the bundle of lilies attached to the other and floated out behind. To have seen him then one would have had some trouble in identifying the queer-looking creature that was slowly but steadily crossing that wide lily pond. Twice he eased his tread to let his tired little legs feel for bottom before he actually reached the other shore and waded out.

Nearby, an old flat-bottomed boat, partly filled with water, was tied to the bank. On the back seat of this he stretched out to rest while his feet were drying and he again could don shoes and stockings. By the time he was ready, the sun was fast going down behind the hills and the nighthawks were beginning to wing their way over the meadows with their hungry babies in close pursuit. Many tree swallows swung back and forth, taking their evening dips in the waters of the lily pond.

But the boy now knew that he must not stop for anything more. He had nine long miles yet to go, and he had had nothing to eat since breakfast.

Dusk settled down while he was yet a long way from home. The little screech owls came out of their holes in the hollow trees and followed beside him along the railroad track, keeping him company with their quavering owl talk and reminding him of his pet owl at home. Indeed, their tremulous call like quiet laughter was a touch of home to him and he who-who'ed and laughed in return.

The way now did not seem nearly so long, and the weight of the lotus blossoms swinging over his back by the rope of grass was temporarily forgotten. He could laugh though his feet were heavy and his shoulders tired, for his heart was light with the success of his venture.

About nine that night a tired but happy boy stepped, blinking, into the gleaming lamplight about which the family sat, and showed his prize. No need to ask where he had been, for there was but one place where those lilies grew, and the mother's eyes shone with an unusual light as she folded her boy, her little naturalist, in her arms while his tired muscles laid the precious bundle in her lap.

No one scolded, nor had they been at all worried over his long absence; they were accustomed to his queer ways. Sister Alice only asked, as she set out his big bowl of bread and milk: "Why didn't you take a lunch with you?"

With the tale of his wonderful adventures but half told, the worn-out little boy dropped asleep, his supper unfinished, and they gently undressed and put him to bed, there to dream of the gold brought back from the end of the rainbow.

Bringing up the Puppy

By Josephine Z. Rine

"THE MORNING AFTER THE NIGHT BEFORE"

PHOTOGRAPH BY GREGORY L. OLIVER

NEIGHBORS are neighbors the world over. They insist on being neighbors under any and all circumstances, and—bless their hearts—this spirit of helpfulness really makes the world go round. In kindly effort to assist in raising the puppy next door, they solicitously offer suggestions running the gamut of invention from a diet of cold carrots to cradling a tired head on the highest stair, so that the first waking move may be a catapult from top to bottom.

Yes, kindness makes the world go round, though this particular form of kindness makes many a puppy's head go round, too, faster and faster until the conglomerate advice boils and seethes in his little brain, and —Bang! off he goes in a fit.

"Good," chorus the neighbors, "every puppy has to have a fit or two in order to become a dog." Which is all very true, owing to the fact that only a few fits are required to steal the little fellow's youth and render him a sadder, wiser dog with a nervous system wrecked for keeps.

Exit neighbors. Enter common sense in the person of one individual who shall elect himself the puppy's guardian, who will feed him his three meals a day, who will find him a safe, warm place to sleep at night, and who will anticipate his little aches and pains and kiss his bumps to make them well. All this, disregardful of the beck and call of help that hinders,—cooks that spoil the broth.

PHOTOGRAPH BY AUTHOR

TO CHEW OR NOT TO CHEW?

At this age little damage will be done to the slipper, however.

A puppy, no matter what the breed or age or kind, is a child. He may eat as a child eats and he may play as a child plays. Most of all, he must sleep as a child sleeps, full half the cycle of the day.

The feeding of the four-legged child is a much simpler matter than is commonly supposed, and if there be a two-legged child or two about the house, it is even simpler yet. With the exception of potatoes, those foods which a youngster needs and gets occupy a like place of importance on Fido's menu.

Fido, aged eight weeks, will probably arrive in somebody's pocket, and whether he may nestle there unseen, or whether he fills it and bulges over, his digestive apparatus is just the same. Large and small, mongrel or pure bred, all need the same plain, simple fare at the start, even though the larger varieties may branch off into coarser foods later on.

From eight weeks until the day of his death, the puppy must have one meal each day of meat, mixed half and half with what is known as filler. We call it so because the meat is the necessary portion of the whole and the rest introduced for the sake of bulk and change of flavor. Any kind of beef or lamb will do—boiled, broiled or roasted, but never fried or swimming in rich gravy. The beef may even be fed raw, and, in the guise of good, old-fashioned ham-

PHOTOGRAPH BY AUTHOR

"LET'S GO," HE SAYS

A ventilated carrying box in which the pup may travel safely and in comfort.

burger, will be relished and appreciated by all growing dogdom.

A custom among breeders who are anxious for their puppies to grow strong and hardy is to give a menu card with every little one sold, listing there the foods suited to various periods of development. A customer of mine went forth one day with a puppy under one arm and a menu card under the other. She was prepared for all contingencies, for she had asked nearly every question of importance and unimportance relative to the welfare of her squirming bundle.

Scarcely had she time to reach home acres, it seemed, when the telephone tinkled and she began again.

"I see you have fish on this list," she said. "Is it necessary to remove the bones?"

"Not if you think the puppy can do it himself," I answered quickly—too quickly. If only I had taken the precaution to count ten before replying, my reputation for courtesy might have remained intact; but as it was, the annoyed click of a receiver, sharply hung, told me that I had forever dammed that flood of innocent questions.

I must have gotten up out of the wrong side of the bed that morning, but I straightway promised myself never to answer a sweetly inquiring woman that way again. Perhaps she wasn't stupid; maybe she simply didn't know, and to know that you don't know, the philosophers tell us, is the beginning of wisdom.

Yes, by all means remove the bones, as well as any tough or stringy portions of meat or fish; these play havoc with the digestions of the younger set. And just to make sure that nothing will get stuffed into that tiny throat, run the whole through the meat chopper; it will require only a minute or two and may save hours of colic and pain, choking and even death.

As to the filler that goes into the dish along with meat, it may be made up of white or whole wheat bread—previously buttered and broken into tiny bits — or corn flakes or shredded wheat, and the whole moistened with soup or milk—only moistened, neither sloppy nor pasty. This will serve as the main meal of the day until the puppy is three months old, when vegetables, simple ones like spinach, tomatoes and onions, may be introduced gradually, one at a time and the amount increased as the youngster develops.

PHOTOGRAPH BY AUTHOR

AS BIG AS A MINUTE

The puppy is just a baby and should be treated as such in the matter of food.

"But how much shall we feed him?" is the universal cry. That no one can answer who has not the puppy in hand. The little gentleman himself is no guide at all, for if he be well and strong, he will, throughout the growing period, belong to the great throng of the unsatisfied. The only safe rule that another may lay down is to feed him until his sides are comfortably rounded but not bulging into unshapeliness. This requires a greater amount than one might suppose and ranges from two tablespoonfuls for the toy varieties to as many cupfuls for Shepherds, Airedales and the rest of the big fellows.

Common sense, coupled with a little practice, will solve the problem of necessary quantity. The healthy puppy is eager to eat and should smile all over when he sees his dish. If he starts as if he had never had any-

PHOTOGRAPH BY INTERNATIONAL

COMPANY OR A CROWD? WHICH?

Jackie Le Ble with some of his playmates, children of "Wrinkles," his father's noted English bull.

thing to eat before, and finishes off with a reluctant scoop around the platter, grumbling to himself, "I think they might have given me a wee bit more," then you are just about right. But if he leaves part, take it away after a time, and what is more, throw it away, and let him see no food at all until the clock says it is time to eat again.

Two other meals will be required in addition to the meat meal, with perhaps a graham cracker or two to nibble on at bedtime. A puppy's stomach seems closely allied with that principle which affects man and beast alike—it is better off when it has something to do. These two other meals may have a milky base—whole, rich milk mixed with bread, zweibach or like simple filler.

PHOTOGRAPH BY H. ARMSTRONG ROBERTS

COMPANY DROPS IN FOR LUNCH

The dog can always be relied upon to clean up the leavings whether good for him or not.

All of a sudden there will come a time when the neck seems to unfold like an accordion, when arms and legs begin to stick out in bumpy ungainliness, when no part of him seems to match or to have been made to connect properly with any other part. This is the time for soft-boiled eggs to get in their good work, and thoroughly cooked rice with a little sugar on it, or maybe milk or butter. And if one day the children turn up their noses at that erstwhile standby, rice pudding (which they probably will), then Fido's sense of economy will rightly prompt him to make short work of such delicious leavings.

The various puppy meals on the market are excellent when wet down with milk or broth, and these should be used in place of puppy biscuits during the first months of life. The question of commercial dog biscuits is one that is entirely dependent upon size and breed, because so often on ultimate body measurement depends the size of the puppy teeth. The toys and middleweights, such as Pomeranians, Pekingese and Boston Terriers, have first teeth too small to break a hard-baked biscuit, but larger breeds than this have usually a tooth formation heavier at the base and can crush small sized biscuits successfully.

The little fellows, then, will require some kind of a baby cracker (graham, educators or whole wheat biscuit) to teach them to chew, while the hardier terriers and working dogs will do well with a few puppy biscuits to play with. Too much reliance, however, should not be placed on any prepared food during the period of greatest growth, as a liberal proportion of fresh food is not only beneficial but highly necessary throughout the first year of a puppy's existence.

One word more as to quantity. The cross bred or what, for want of a better name, we call "plain dog," will usually stand in need of more food that his blue blooded relative for the simple reason that he will probably grow larger, and also because the call of a varied ancestry gives a quality of lustiness and unhampered development not often found among thoroughbreds.

Keeping a puppy warm is almost as necessary as feeding him properly, for the heat and energy which food builds are needed to make him grow, and this cannot well be

PHOTOGRAPH BY INTERNATIONAL

YOUNGSTERS OF ST. BERNARD ROYALTY

These puppies are rated high among dogs of their breed. Sturdy though they are, it is well to look to their diet with care.

spared to warm him if he is left in a huddled shivering heap out-of-doors.

Which reminds me of the time a very little girl called to show me how well Buddy was growing. I am not quite sure that the pup's name was Buddy, but even so, it will answer because that name covers almost the entire doggy population that finds its way into the keeping of little girls—just as Bill is the universally accepted cognomen of most dogs belonging to little boys. So in case we are ever at sea in this matter of names, we first try Buddy, then Bill, and ten to one we win.

PHOTOGRAPH BY WILLET RANDALL

FUTURE LEADERS OF THE CHASE

This is Wannawac Patch with a few of his offspring at the Randall Kennels. His is a large family.

But to return to the little visitor. After several layers of doll's clothes had been unwound, the puppy emerged, resplendent in spiral patterned underwear. Cinderella, mice and pumpkin were never more radiantly transformed than was this passé stocking, cleverly converted into the glove fittingest of sporty sweaters that ever served to warm a baby dog. Around and up went the garish diamond shapes in fantastic design, the whole marred in the making by a neck line of crocheted scallop in a shade that didn't belong—truly a tame and uninspiring finish to what was otherwise quite the vogue.

When a broad, contagious smile of appreciation infected the admiring circle, the little lady proceeded to explain that, inasmuch as Buddy had chewed one stocking beyond repair, mamma thought that he might as well use the other one, too. Proving beyond the shadow of a doubt that puppies are a source of true economy; they use up so many things.

The question of play is one of the essentials of sound puppy raising for on its proper auspices depend both physical and mental development. Play is nature's urge for exercise for those too young to know its value or its necessity. It is the safety valve of youthful force and joy of living, contributing to mental poise no less than to physical perfection.

But nature, however well intentioned, does not always allow for the wear and tear of nervous force, and thus bids the puppy play sometimes beyond his strength. Too much play or too many hours spent in trailing after the young folks may result in a high strung mental condition which more than offsets the value of the muscular activity. It is therefore of the utmost importance that the puppy have plenty of sleep, and that, when he is so disposed, he be left undisturbed.

So many have considered that dogs are in the nature of a family amusement, subject to the dictum of whoever cares to see them perform. When one member tires and leaves off his baiting, another takes up the game, so that at the end of the day Fido is nervously excited and physically exhausted.

This kind of exhaustion steals first the vitality of digestive functioning. Fido spits up and is thereupon classed with the army of the unfit, when, as a matter of fact, his stomach was doing nobly but his nerves balked, refusing to play a game that wasn't played fair. Countless puppy troubles arise from a disregard of the fact that a puppy is a child and must not overdo in any particular. An animal heritage demands that he grow strong, but human relatives demand also their tax of amusement, protection and cleanliness at a time when he already taxed heavily with growing.

The basic principles of puppy raising are much the same regardless of breed, size or forebears. Though the blood of the entire four-footed universe mingle joyfully in his veins, the fact that he is little demands for any puppy the same degree of intelligent care as that which marks the raising of high steppers of the ring. If you will but feed him moderately on plain and simple fare, exercise him moderately through safe and sane play, and, after this is done, if you will let him sleep to his heart's content, you will then have a puppy that may enjoy his full measure of health and happiness, of growth and perfect development.

Insect Engineers

By FINLEY H. THOMPSON

NATURE taps us often on the shoulder to bid us note the marvels of some of her creatures. Ants, perhaps as much as any others, excite our interest in their ingenuity and activity. Both these faculties in the busy little insects came to my attention recently when I came upon an ant hill constructed on a flat topped rock which stood up about two feet from the ground that surrounded it. Noticing the ant-hill, I found also that there were swarms of red and black ants going and coming but there were none on the side of the rock. Then I discovered that on one side the ants had constructed an incline of about forty-five degrees and were carrying their food and material up to it. This is shown at the left of the illustration. Truly, we must doff our hats to these tiny insect artisans.

A VIEW FROM THE TROPICAL RESEARCH STATION

The Rain Canon in which the Tettigoniids were found is just beyond the first big group of vegetation.

Music-Makers of the Rain Cañon

By PAUL GRISWOLD HOWES

(PHOTOGRAPHS BY THE AUTHOR)

NIGHT in the Dominican forest is loud with the Orthopteran chorus. The strange ventriloquial voices fill the moist atmosphere, and save for an occasional tree frog, that tries to be heard by its mate-to-be, and the tumbling of huge fireflies, like greenish-yellow meteors, there is little to distract one's attention from the shoutings of locusts and crickets, great and small.

There is the common "zeee, ze, ze zeee, ze, ze" of the longhorned green locusts, similar to the salt marsh chorus of a summer night at home. Here and there is the deeper, rasped note of a larger species. Everywhere sound the clear musical notes of the blacksmith, which sounds like a smithy beating a horseshoe upon his anvil. When several of these insects are calling together, it is exactly as though as many pieces of steel were being tapped with metal hammers. They vary somewhat in tone, and the effect is delightful and unusual.

This is the third article in the series that Mr. Howes is writing specially for the members of the American Nature Association on the fascinating and important discoveries made at the Tropical Research Station in Dominica.

One mile north of the Biological Station, and running approximately east and west, and at least two hundred and fifty feet below our level, is a lovely mountain stream bordered to the very water's edge by a magnificent rain forest. The stream rushes amongst great volcanic boulders of gray and pink and brown. Here it runs madly for a space, there it dips over a flattened rock and plunges into a deep pool that reflects the forest in water of aquamarine, and in which boulders turn blood red under a canopy of minute algae. Shrimps in suits of mottled olive and slate, and larger crawfish in olive and orange live happily in these waters, while little, bottom-mimicking darters suckle about for vegetable matter, browsing over the

ONE OF THE MUSIC-MAKERS

This male is about two-thirds life size. Note its mottling to resemble the surrounding lichen.

algae coated rocks from old volcanoes.

Along the stream banks grow tree ferns and maidenhairs, and all the vegetable wealth of the Dominican world. Towering above these lesser people are enormous Moras and other hard, wide buttressed trees, the soil washed out from amongst their roots by cloudbursts rushing down this valley. Ever fighting for life, they have sent their high, flat supports far and wide, until now they are weird and fantastic to the newcomer amongst them. The bark is lobed and twisted, moss-grown and studded with varicolored flecks and dots of a dozen lichen families. Air roots drop down in hundreds to the water of the river from parasitic plants in the branches above. Aerial snails ascend and descend these hanging gardens as the spirit moves them, and all about one is the true atmosphere of a real jungle.

PHOTOMICROGRAPH OF THE MUSIC DRUMS

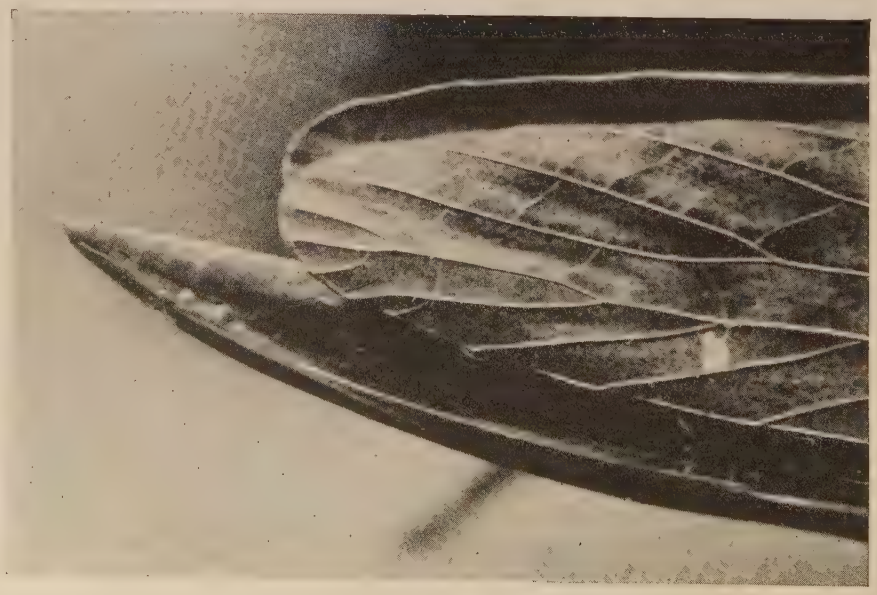
The two frames in the center of the picture hold the sounding boards under which are the file and pick.

I stood beneath one of these great trees growing almost within the stream. Above me the junction of two great buttresses had, in days gone by, formed a dark thimble-shaped cavern that proceeded up into the tree for perhaps four feet. Moss and lichen had painted its walls in strange patterns, and here had come to live, at least by day, the most wonderful Tettigoniids that I had ever seen. At first I had seen nothing in the dim light of the cavity, but as my eyes became accustomed to its shadows I saw five huge and horny locusts huddled together in a group, their legs stretched out straight before and behind, and their hairlike feelers, seven inches in length, moving in the breeze that stirred in their dismal den. Looking more carefully, I found them to be patterned exactly like their surroundings of colored moss and lichen, the most beautiful examples of protective coloration that I had ever found.

When night comes, these strange creatures of the rain cañon ascend to the foliage to feed in high green pastures. Even now they are protected in a remarkable manner, for their two hard wing covers are as perfectly colored and intricately veined as any real leaf that ever grew. They are powerful and hard-willed besides, and possess a strong pair of biting mandibles, spiked legs and heavily clawed and suction-padded feet. This is a combination that makes a human being think twice before picking one of them up. What a struggle there was when I tried to transfer them from my net to a killing bottle. It was with real difficulty that the transfer was made.

In my catch I had four males and one female. She was considerably larger and possessed of a huge bladelike ovipositor with which to pierce plant tissue when depositing her eggs. Her coloring was not as gaudy as that of the males, but highly protective nevertheless. The males varied somewhat, and one possessed a deformed and atrophied front leg that did not touch the ground when the insect walked.

Most wonderful of all was the sound-producing device of this Tettigoniid, situated upon the inner edge of the two wing covers. Close examination shows a strangely shaped area on either cover, which consists of a bevelled frame of a substance called chitin. This frame holds two tightly stretched bits of parchmentlike material placed a fraction of an inch apart, so that a distinct sounding device like a minute drum is the result. One of these frames with its two skins is found on each wing cover. Underneath the left-hand drum is a crescent-shaped band bearing tiny teeth like those of a comb, and over the right-hand drum is a "pick" which possesses a rather sharp, hard edge.



OVIPOSITOR OF THE FEMALE

This large, bladelike organ is shown protruding from beneath the wing-tips of the insect.

When the locust wishes to "sing" or call its mate, it raises the two wing covers and, by moving them backward and forward, causes the pick to pass over the teeth of the comb. A sound

is instantly produced and amplified by the two drums, and thus the terrific, loud and harsh calls of this great Tettigoniid are made to resound through the forests.

One may raise the wing covers of a dead individual and produce the sound on a small scale artificially. To get the idea of how this device works, scrape your thumb nail across the teeth of a heavy comb. Then imagine the sound greatly amplified and you will have some idea of the music.

Only the males have the sound apparatus developed to such a degree. The female is equipped, to be sure, but with a much more poorly designed sound-maker. It is situated nearer the middle of her back, and, as she probably has little to do with the vocal courtship proceedings, it is quite unnecessary anyway.

I wonder where the female Tettigoniid deposits her eggs and what becomes of the youngsters during their first few weeks of life. Of course young locusts are very much like their parents, that we know, but I should like to see these particular babies anyway. Perhaps it will not always remain a mystery, but it is one thing to find creatures in the Dominican forest by day, and quite another to follow them at night when they are most active.

These Tettigoniids are big and powerful, strong and hard biting. They are wonderfully protected by their mottled, lichen-mimicing coloration. They live in dark cavities among the forest giants by day and only leave for their lofty feeding grounds under the shelter of darkness. They look forbidding, although extremely beautiful, and with all these characters they have become fearless, dominant dwellers of the rain cañons. So they will doubtless continue.

Pine Nuts—Yum, Yum!

By Salome Comstock Miller

MANY people eat pinon nuts which, strictly speaking, are not nuts, but nutlike seeds—without knowing that they grew on a pine tree. There are two kinds of nut pines or pinons, the one, *Pinus edulis,* having two needles in a bundle, and the other, *Pinus monophylla,* having single leaves. Aside from this difference they are very similar.

Pinon nuts are so small that the only practical nut crackers are one's teeth. They are so thin shelled that a blow heavy enough to open an English walnut would mash them completely, and the fingers which held them would be in grave danger. In fact, the only excuse for indulging in the tedious pleasure of eating these nuts, unless one were very hungry, would seem to be the delicious flavor of the tiny kernels.

PHOTOGRAPH BY H. K. KIRK

PINE NUTS AND THEIR CONES

The nuts above are shown about twice actual size, and below are two views of the cones from which they come.

Like a slovenly old woman in whose untidy kitchen are manufactured unexpectedly good pies, a forlorn, ragged, runty-looking pine produces these palatable tidbits. It is found out on the thirsty foothills of the Rocky Mountains, among the boulders and cactus, where no other tree would grow. Lop-sided, angular, and often decorated with several dead limbs, the tree serves as a noonday shade for range cattle or provides good pitchy wood for the sheepherders' campfire. It supplies the children with a pocket full of nuts, or a chew of gum from the resin. Very toothsome candies may be made from the pinon nuts by those who have the time and patience.

It is comparatively easy to gather these nuts while they are still in the cones. When the nuts are fully mature, the scales of the cones in which they are stowed away, one or two in the axil of each scale, separate, permitting the nuts to fall out. Before this happens the gatherer must have his cones safely stored in a box or bag, in which the seeds will be caught as they fall or are shaken out. The cones are easily accessible, and any necessary climbing about the low spreading tree is not difficult, and, besides, the return warrants the trouble

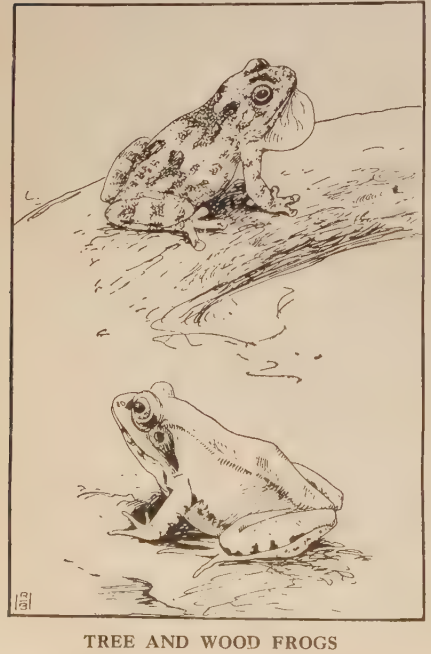
Some Interesting Things to See in September

By E. Laurence Palmer

(illustrations by R. Bruce Horsfall)

TO MANY people the month of September means the beginning of the season for oyster stews, or the beginning of the season when the furs of many wild mammals begin to have some sale value. It is the first of the months with the letter R in its name and, as such, may be classed in a way with the winter season. In spite of this classification there are many good, warm September days when we wish that the comparison were more reasonable. We might, if we wished, consider the month as one of the "ember" months and compare it with the embers of our campfire. The fiery heat of August begins to let up at intervals in September, anyway, and we may begin to enjoy a cool evening now and then, just as we can enjoy the campfire when the heat of the blazing fire has given way to the more kindly warmth of glowing embers. However we may care to classify the month, Nature begins to show very definite signs of the approaching winter. To be sure, it is not so obvious as it may be later, but the signs are there, nevertheless. The birds are beginning to move south. Some of the common summer mammals are beginning to go into winter quarters by the end of the month. Some plants are beginning to shed their leaves for the winter, and many insects are making a last desperate effort to "live the life" before they die or dig in for the winter. All of these changes offer splendid opportunities for those interested in Nature to "get a kick" out of a hike in the open country.

BATS ON THE WING



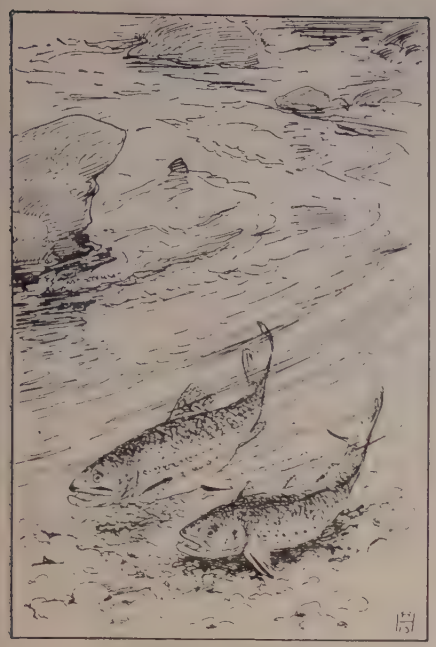
TREE AND WOOD FROGS

Of course woody plants are always interesting. In September some of them are particularly so. A very large number of them are bearing their ripened fruits, which appeal not only to us but to other forms of animal life. If you have never done it before, examine the twig from which you pluck a ripe apple, and determine as carefully as possible the nature of the scar left by the plucked fruit. Examine the twig to see if there are any similar scars which would indicate that the twig had borne fruits previously. Do these occur at regular or at irregular intervals? Are they more abundant on short, stubby spurs or on vigorous "sucker" shoots? Are they generally at the tips of main branches or back from the tips? Do woody plants other than apples bear their fruits in a similar manner? Learn to identify the scars left by fallen fruits from as many woody plants as possible. This may be valuable to you later when you may desire to prune these plants to make them produce the most satisfactory fruit.

Not a few woody plants that shed their fruits in the fall seem so impatient to start developing new plants that the seeds contained in the fruits begin to germinate so that the seedlings make considerable development before the winter sets in. We sometimes think that spring is the only season when seedlings have any right to exist. When you are on a hike through the woods this fall see if you can't find in September quite a few different kinds of woody plant seedlings or babes of the wood, as they have been called. Remember that some of these seedlings may be so small as to be well hidden by the roughage on the forest floor. Are you able to find any maples, ashes or oaks developing seedlings at this time of year? If so, is this true of every species of these groups of trees?

While hunting around in the woods or in the orchards you may find a few frogs like the wood frogs with their dark "masks" or the tree-toads with their "sticky toes." Even though you may not find these or other frogs you may hear frogs of not a few species in the month. The frog-calls of the season do not in volume compare with those which made up the spring chorus, but they are present in the sounds of the out-of-doors in September and may be used as a test to see if you can remember the spring calls which were so common earlier in the season. Do these calls persist

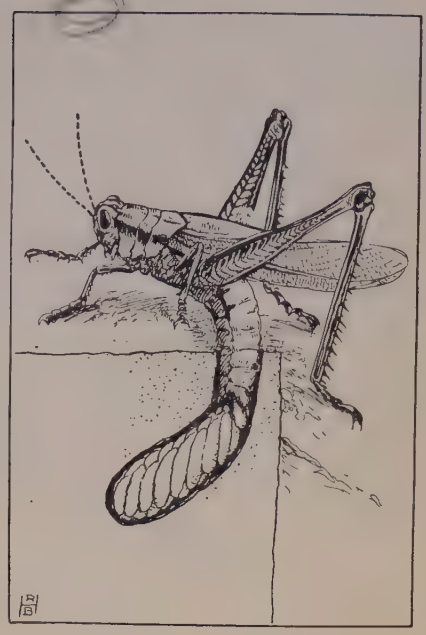
STRIPED GROUND SQUIRREL



TROUT SPAWNING

throughout September, or are they all stilled by the end of the month? If you cannot identify frogs by their calls, make a little frog census of some nearby plot of ground and see if you find as many at the beginning of the month as you do at the end.

Many people enthuse over the spring arrival of birds and frogs in the same manner as they enthuse over planting a garden. Almost as many fail to continue keeping the weeds out of the garden as continue to maintain their interest in the activity of birds throughout the season. For this reason data as to the last appearance for the season of a given species of bird in a community are less common than similar data as to the first appearance. September is a good month to begin to keep track of last appearances. Many birds just seem to vanish without any conspicuous flight in flocks. Many other kinds seem to be practicing up for the long fall migration by making daily migrations between feeding grounds and roosts. In making these flights many birds assume characteristic formations which make it possible for the trained observer to tell the kind of birds in a flock so far away that the individual birds could not possibly be identified. Two conspicuous flight formations which are evident in September are illustrated by the red-winged blackbirds and the bronzed grackles. In one of these species the flock forms in a rank at right angles to the direction of flight, and in the other the flock forms in a long file not at right angles to the direction of flight. Which is which? Not a few other species of birds have somewhat similar flight habits. The well-known V of migrating geese scarcely needs mention in this connection. Other interesting things to notice about migrating birds in September concerns itself with the height above ground at which various species migrate. Do flocks in crossing a valley, say two hundred feet deep, fly straight across at a constant level, or do they follow the contour of the ground, remaining approximately the same distance above the ground at all times, or is no generalization in this connection possible? Does the size of flocks of blackbirds seem to increase or decrease during the month of September? Of course, I do not mean to imply that all bird activity in September is concerned with migration nor to imply necessarily that it is the month in which the southern migration is always the most conspicuous. It is, nevertheless, a phenomenon worth watching at this time of year.



GRASSHOPPER LAYING EGGS

As implied in the introduction, there are many interesting activities of the smaller mammals that can be recorded with profit in September. The mating habits of a few species of bats may possibly be observed. If you get interested in bats, you may like to "keep tabs" on their activities as well as upon bird activities. Some species migrate to the south like the birds, and some remain north, hibernating like some of their closer relatives among the mammals.

Bats are not the only mammals to be observed profitably in September. The chipmunks that have been more or less quietly engaged in matters of serious import to them during the summer may begin their characteristically oft-repeated whistle so typical of the fall months. The striped ground-squirrels of the middle west may begin to disappear into their holes for the last time for the fall before the end of the month. If any of these small mammals so active during the summer do begin to go into winter quarters by the end of the month, do they leave the entrances to their burrows open or do they close them? If this may not be observed in September, set it down in your notebook for observation later in the season. If possible, see if you can decide whether the family of the year breaks up before the winter rest or whether the break-up comes the following spring. This is not a uniform matter among the smaller mammals and may give you quite a few profitable observations before you come to your final conclusions.

CRAB SPIDER AND GOLDENROD

Migrations for the beginning of the fall are not limited to birds or mammals. Not a few species of fish set about to find places where they may lay their eggs and start a new generation on its way. Probably some of our trouts are the best objects of study in this connection at this time of year. The rainbow trout generally breed during the earlier months of the year, but the brook trout may begin breeding in September. The eggs are laid in nests of pebbles about at the break of a riffle or sometimes elsewhere. Nests are not always made, I believe, but watch to determine if trout pair or if they may be rather promiscuous in their mating habits. This will undoubtedly be a rather difficult thing to determine.

Of course, a September without insects would hardly seem

normal. At night we hear the katydids arguing in the tree-tops, and during the daytime the grasshoppers do their part to keep our ears supplied with something worthy of our attention. I am sure that after reading Mr. Brownell's article in the last NATURE MAGAZINE you will wish to continue on through September making the observations there suggested primarily for August. Grasshoppers and katydids and crickets call for a reason other than that of entertaining us. If they call successfully, egg-laying on the part of the females may be in order before very long. The egg-laying habits of grasshoppers and their relatives are frequently observed without great difficulty. Some of the commoner short-horned grasshoppers lay their eggs underground. Some of the katydids and their kin lay them on leaves or under the bark of twigs. Some, like the praying mantis, lay the eggs in conspicuous masses on weedstems and other roughage a few inches or feet above the ground. These various egg-laying requirements mean that a variety of egg-laying tools or structures must be present. An egg can be placed on the margin of a leaf with greater ease than it can be placed a few millimeters underground or under firm, healthy bark. The short-horned grasshoppers that lay underground are generally easily observed on bare, hard ground. Not infrequently I have seen them attempting to place their eggs between the flagstones of a city sidewalk. How are these grasshoppers fitted for placing the eggs underground? Are there any farm tools built on the same general plan?

An alder swamp in September may be conspicuous because of the patches of white "alder-blight" aphids. These are always interesting because of the way in which they seem to get excited when disturbed. These patches are, of course, composed of large numbers of the plant-lice that are feeding on the juices of the plants. If you will examine a considerable number of patches, you may sooner or later come upon one which not only is composed of aphids but also contains the caterpillar of the wanderer butterfly. This caterpillar is interesting because, unlike most caterpillars, it lives upon other insects. Because of this habit these butterflies are, of course, useful. A visit to these alder bushes late in the season or late in this month may show you for the first time the peculiar "monkey-faced" pupal stage of this butterfly. Does it hang face downward or in the reverse position?

Spiders, as well as insects, hold interesting possibilities for observation in September. For example, some of you may have noticed the crab-like spiders that hid last spring in the throat of the flowers of trillium. At that time they were, like the trillium, almost white. Some of these same spiders may possibly now be found on heads of goldenrod. Naturally you would not expect them to remain conspicuously white, and it will not surprise you when I tell you that they have now become yellow. You may enjoy making captives of a few of these spiders and see if you can in any way induce them to change their color again. You might like to know whether this could be done instantly or whether it takes considerable time. An ordinary tumbler may make an ideal observation cage in this connection.

We might go on and mention any number of other things worth seeing in September. Many of the reptiles, apparently, will be thinking about digging in for the winter. At least some of them may be seen for the last time in September in some parts of the country. Do they seem to be any fatter than they were in early summer? A few snakes will be giving birth to their young early in the month, if they have not already done so. People say that snakes swallow their young. What do you think about it? Have you ever actually seen a snake swallow its young and, if so, have you been able to get the parent snake to free its young once they are swallowed? If you have actually seen these things, stick by your guns. If you haven't, you might well "hold your fire" before agreeing with someone else on the matter.

PHOTOGRAPH BY GERTRUDE STOCKLEY

TOMATO CATERPILLAR LADEN WITH THE EGGS OF SOME PARASITE

WESTERN GOLDEN-CROWNED KINGLET

Regulus satrapa olivaceus

The fir woods of the Pacific coast region hold no lovelier gems than the small flocks of these birds which dart about among the branches hunting insect eggs and talking in their high pitched voices. Little do they care whether they are upside down or not. It is all one with them. If the weather be fine, they keep to the tops of the trees and are well out of sight; but on a damp morning they feed among the low branches or in the brush along pathways. They have an interesting habit, common to a number of birds—that of darting out from tree or bush to catch a passing insect on the wing. Their deep cupped nests, placed well under cover near the end of a fir branch, are made of green moss lined with feathers, and contain from five to ten buffy eggs with darker speckles around the larger end. When these are hatched a lively family joins the woodland population. The average length of the bird is 3.75 inches.

WESTERN WINTER WREN

Nannus hiemalis pacificus

One of the marvels of bird music is the long-continued bubbling song of the Winter Wren. It seems impossible that so much sound could come from so small a body. At a distance he may be mistaken for a mouse moving unobtrusively about among the decayed wood of an old ravine, but suddenly he appears at your very feet with his ridiculously short tail perked up, and gives an inquiring chirp. If there is a feather-lined nest of moss in a crevice of the old log or under the roots of an overturned tree, with finely speckled creamy-white eggs in it, he will go off quietly about his business of hunting worms and small white grubs in the treebark, soon losing himself in the dusk of the deep woods. He is in most places a permanent resident and may be seen during the winter in the shelter of deep woods or canyons always on the ground or upon fallen logs. His average length is 4 inches.

WESTERN EVENING GROSBEAK

Hesperiphona vespertina montana

If, when the maples bloom in Oregon, you hear a sound comparable to a band of baby chickens lost in the treetops, don't be alarmed, but consider yourself fortunate; for there will be a flock of Evening Grosbeaks busily feeding on the maple seeds which are just taking form. Bronzy gold, with a flash of pure white, marks the bird when in flight. It breeds in the higher altitudes of western United States. The nest, built rather high up in conifers, is made of small sticks, lichens and fine grasses, and will contain three or four brown-blotched greenish eggs. During the winter and early spring the birds flock to the lower areas. As its bill would indicate, its food is mainly seeds and buds of trees such as dogwood, ash and juniper. Often the whole flock feeds upon the fallen seeds and then the white wing patches are in strong contrast to the bare soil beneath the trees. Its average length is 7 inches.

CHESTNUT-BACKED CHICKADEE

Penthestes rufescens

At one period not so long ago, these birds were relatively scarce in the Willamette Valley. but during the past few years they have been on the increase until now they outnumber the Oregon Chickadee. They prefer the more open woods and a rainy day is no deterrent to a hunt through the wet branches for insects and their eggs. They are constant patrons at the feeding shelf and are common all the year round. Their nests are built in stubs of trees well up from the ground. Hair and fur, feathers or moss compose the lining, and the eggs are white, usually unmarked but sometimes minutely spotted with reddish. Families are usually large with the Chickadees, and the territory from Alaska south into California and east to Idaho is well supplied with the cheery little fellows. In the winter woods they hunt with the Kinglets and Bushtits. They are about 4.75 inches in length.

CALIFORNIA PURPLE FINCH

Carpodacus purpureus californicus

This bird should be called the Warbling Finch, for no sweeter warble comes from the throat of bird. All the year round he sings forth his challenge along the Pacific coast from British Columbia to southern California. A bird of the higher altitudes in the southern part of its range, it is also common in the valleys of the north. The nest, made of loosely woven rootlets and grass, is built well out on a high branch. There are three or four greenish-blue eggs with fine dark speckles on the larger end. Theirs is the short, strong bill of the Finch family and indicates that their food is largely seeds, but in the early spring they choose undeveloped ones, especially cherries while still in the bloom, and have been known almost to denude some trees of their first blossoms. The male of this species does not attain full color until the third year. The average length is 6.25 inches.

OREGON TOWHEE

Pipilo maculatus oregonus

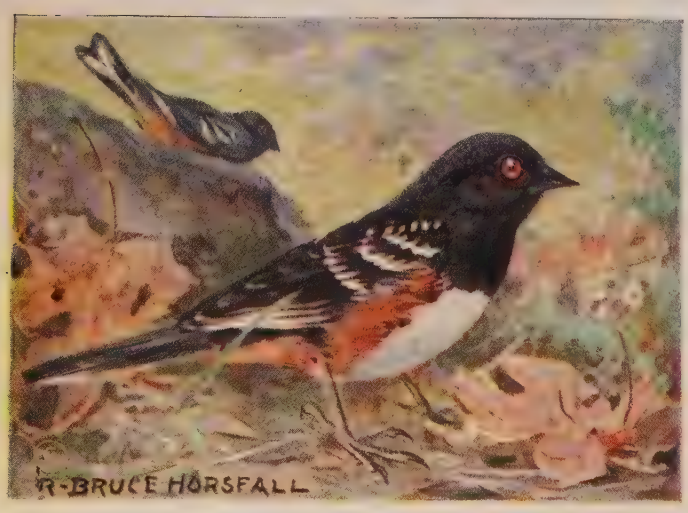
The Towhee is a bird of the ground and low bushes in which it builds its nest of small sticks or stripped bark lined with grass. The four or five pale bluish-green eggs have brown or lavender speckles thickly sprinkled over the larger end. A rustling of dead leaves kicked vigorously back to disclose grubs or seeds for his lunch is a sure sign that Towhee is about; and, if you are near enough to see the red eye, no further evidence is needed. In the warmer valleys of the northwest the Towhee is a permanent resident. However, those which breed in British Columbia probably spend the winter in southern California. They are shy birds and only rarely to be observed when perched upon the top of a bush singing; for the least suspicion that you are watching sends them off among the brush. The Oregon Towhee differs from the Towhee of the east in the white marks on the shoulders. Their average length is 7.80 inches.

CHESTNUT-BACKED CHICKADEE—*Penthestes rufescens*

WESTERN GOLDEN-CROWNED KINGLET—*Regulus satrapa olivaceus*

CALIFORNIA PURPLE FINCH—*Carpodacus purpureus californicus*

WESTERN WINTER WREN—*Nannus hiemalis pacificus*



OREGON TOWHEE—*Pipilo maculatus oregonus*

WESTERN EVENING GROSBEAK—*Hesperiphona vespertina montana*

THE NATURE LEAFLETS
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EXCLUSIVELY FOR AMERICAN NATURE ASSOCIATION

RUBY-CROWNED KINGLET—*Regulus calendula*

OREGON CHICKADEE—*Penthestes atricapillus occidentalis*

SEATTLE WREN—*Thryomanes bewickii calophonus*

WESTERN BLUEBIRD—*Sialia mexicana occidentalis*

WESTERN MEADOWLARK—*Sturnella magna neglecta*

OREGON JUNCO—*Junco hyemalis oreganus*

OREGON CHICKADEE

Penthestes atricapillus occidentalis

The Oregon Chickadee often joins the Chestnut-Backed Chickadee on the feeding-tray during the cold weather and is as fond of suet and oatmeal as the others. The families hunt together, and seven or eight young may accompany the parents. The friendly little mites will answer to your whistle, follow you from place to place, and will readily learn to eat from your hand. No amount of cold or stormy weather will drive them from their accustomed haunts. They are valuable friends of the trees, for they keep everlastingly after the eggs and larvae of injurious insects. They nest in holes in trees or stumps, lining them with moss, fur and hair. The eggs are white spotted with reddish-brown. This species is found in the northwest coast region from Sitka to northern California and is abundant throughout its range. The average length of this bird is 5 inches.

WESTERN BLUEBIRD

Sialia mexicana occidentalis

The babies of this family show their Thrush relationship by having spotted breasts. Fond of semi-open places, these birds will be glad to occupy a properly constructed bird-house in your garden and will build a nest in it of soft grass and bits of string. From four to six pale blue eggs will be laid, and when the babies are hatched the parent birds will keep your premises well patrolled for injurious insects of all kinds. They especially need your protection from cats at this time, for they are so intent on the business in hand that they fall an easy prey to Tabby. The chief differences between this bird and the Bluebird of the east are the russet across the shoulders and the blue throat. Both are much beloved and welcome harbingers of spring. The Western Bluebird often remains as far north as the Columbia River throughout the winter months. The length is 7 inches.

OREGON JUNCO

Junco hyemalis oregonus

The flash of white outer tail feathers, as he alights on the patch of ground cleared of snow and provided with seeds and rolled oats, the pink of the bill with which he immediately begins to pick at the delicacies spread out for him, mark friend Junco. He is often called Snowbird because we see more of him and his friends in the winter than in the summer, when he is busy with family cares high up in the hills. The Oregon Junco has a really black head and collar with dark brown back and breeds north of the United States border, thus being only a winter visitant with us. His nest is usually on the ground—a cup of dry grass and rootlets, with four or five neutral toned eggs speckled with reddish-brown. The young birds, unlike their parents, are streaked light and dark gray and have dark bills. The food of the Junco is a mixture of weed seeds and insects. His average length is 5.75 inches.

RUBY-CROWNED KINGLET

Regulus calendula

If one is fortunate enough to see the male of this species when he is very much excited, or when he is drying himself after a bath, one will well understand his name, for the spread crown patch looks like a brilliant ruby set in dull gray silver. The Ruby-Crowns are found in company with the Golden-Crowns during the time of flocking and, like them, feed among the branches, seeking insects and their eggs or small spiders. They add a cheerful note to a dull day by their sociable lisping chatter. Their half-hanging nests are made of bark fiber and moss, lined with hair and feathers, and are hidden in the tops of fir trees far up in the mountains. The eggs are whitish with a few brown marks at the large end. Ruby-crowns, Nuthatches, Chickadees, Bushtits and Hermit Warblers are jolly companions when the young are out of the nests. The length of the bird is 3.75 inches.

SEATTLE WREN

Thryomanes bewickii calophonus

Should you chance to take a path too near to the feeding ground of this wren, you may expect to be roundly scolded for your intrusion, as he brooks no interference. The nest will be built in an old stump on some brushy hillside, or in crannies around buildings, in much the same manner as that of the house wren, although woods rather than the vicinity of houses is preferred. The eggs, five to seven, are pale pinkish, finely speckled round the larger end with reddish-brown. The white stripe over the eye and the long, dark tail are good identification marks for all forms of Bewick's Wren. This variety is a permanent resident within his range along the Pacific coast from Oregon to southern Vancouver Island and sings during the entire year, making the woodland resound with his clear, ringing tones. At times his song may be heard in the night. He is about 5 inches in length.

WESTERN MEADOWLARK

Sturnella magna neglecta

Wherever, west of the Mississippi River, meadows or open uplands exist, there will be heard the pure, clear tones of the varied song of the Western Meadowlark as he poises in mid-air or perches on fence post, telephone pole, or perhaps selects the highest tree in the neighborhood. The Meadowlark is a ground nesting bird, and his roofed-over home will be hidden in some grass clump and have a long entering runway. The food for the six or seven babies consists of grubs, cutworms, grasshoppers and crickets. The Meadowlark is a permanent resident except in the northern part of his range, because he is able to find sufficient food for his needs and does not mind the cold. He may be easily identified by the long bill, black collar on yellow breast, and the white outer tail feathers which are noticeable in flight. He is quite a plump bird and his tail is relatively short. His length is 9.75 inches.

LADY

THE STORY OF A RED FOX

By ELEANOR B. PACK

THE SOFT hum of the motor became monotonous as we passed farm after farm and woodland after woodland, gradually ascending into a more hilly country with occasional glimpses of the blue hazy foothills of the Adirondacks. Down into a lush green valley we dipped and through a quaint little village. Suddenly, as we passed one of the last of a row of unpainted houses, I caught a glimpse of a pair of mischievous brown eyes peeking at us from behind the shelter of a tree in the dooryard. Our protesting brakes grated noisily as the machine came to a stop, and soon we were backing up to get a better look at the furry creature which dashed away from us toward the house like a reddy kitten. It was a baby fox, not more than three months old. After some inquiry we found that it belonged to a schoolboy who had dug it out of its den some weeks before. Negotiations began and the grinning youngster became a capitalist in his own estimation, and we acquired a new pet to take home and introduce to our collies.

Lady—for that was her name—was a shy, timid little sprite, who wanted nothing so much as to be left alone. So we tried to take no notice of her except for an occasional peep between the slats of her wooden crate. Nor on our arrival home did the collies take much notice of her. Rover, being six years old, deemed himself too dignified to be surprised by anything, and, after one sniff, occupied himself solely in seeing how much noise he could make to show his master and missus how glad he was to have them home again. But Jill, being only a year and a half, was keen to play and was very much disgusted when the fox retired into the corner of her box and only snarled at her friendly attempts.

Evidently Lady had been frightened by too much intimacy with the hasty movements and cries of children before she came to us, for it took many days of patient treatment, holding her quietly in my lap and sitting beside her on the lawn, before she began to feel at home. We built her a nice roomy cage, and when we were at home we let her run on the lawn, attached to a sliding trolley to which the dogs had often been tied. This was an ideal arrangement, and Lady soon investigated as to just how far she could go in each direction. By this time her youth asserted itself in an overwhelming desire to play. First she began with a tennis ball, throwing it high into the air, sometimes catching it before it fell, at other times letting it roll away and then crouching and springing upon it as lightly as thistledown. One day by chance the ball fell into her pan of water, and what was her delight to find that it floated and could be bounced about by gently tapping it with her paw. With her neck arched and ears cocked, she would watch the ball and then lift her paw gracefully above it to bounce it. A kitten was never so graceful as our little red fox. After she had played for awhile, she would dig a small hole and put the ball into it. Then, standing over it with all four feet together and back arched, she would spring straight up into the air for a foot or two as if tossed by some invisible spring, each time landing lightly in the same place. Her tail always added to the picture, but in her puppy stage it always looked like an after-thought, a pretty plume pinned on behind. It followed her movements in sweeping gestures but never wagged or moved of its own accord to express emotion.

One remarkable fact about Lady's games was that she never let that ball get out of her reach. Once or twice she accidentally let it slip just too far, but after some maneuvering Lady discovered that, though her front paws could not reach it, by swinging around with her head facing the chain, her hind legs could kick the ball sidewise and back within her play area. Her intelligence in all her tricks far surpassed that of any dog I have ever seen.

When first we had brought Lady to join the family circle, the song birds objected very noisily. We feared that her presence might drive them away from our bird baths and pool. But after a day of scolding and arguing, they began to learn that Lady could not chase them, and then settled back into their daily routine of bathing and feeding without noticing her. In fact, the song sparrows became so used to her presence that several times I feared for their safety. One little fellow in particular used to come to drink from Lady's pan of water and

"ONE DAY THE BALL FELL INTO HER PAN OF WATER"

hopped about the grass near the fox, unmindful that Lady's sleepily closed eyes only hid a watchful and tense alertness. However, the song sparrow is still free, so Lady's strategy came to naught.

Now Jill, the collie, was most eager to join in the game with Lady. Nothing intrigued her so much as playing, and Rover was a little too dignified to play as much and as boisterously as she desired. But after one or two sudden snaps which had greeted her first attempts at friendliness, she was a little afraid to venture too near the fox. Lady, on the other hand, was now perfectly ready to play with Jill and begged her to play. Jill would lie down beside a chair on the lawn near Lady, whereupon the fox would bounce around one side then on the other like a miniature whirlwind, moving so fast that poor Jill was dazed. At the first movement from the dog, off Lady would dance to the other end of her chain, leaving Jill to wonder just what sort of a game this was. Then Jill would lie down again and the whole procedure would be repeated. Finally, Jill would begin to whine in the soft tone of voice she used in talking to us, as if to tell the fox that she would very much like to play with her but that she didn't quite trust her. Lady's teeth looked a little too sharp even for Jill's shaggy coat, and her movements were far too fast. So, in resignation, the collie would try to take a nap, only to be awakened by Lady, who had crept up upon her and pulled her tail, then darting off again to hide behind a tree and peek around the edge of it with a roguish twinkle in her soft brown eyes and her little rose-petal tongue curled up delightfully in an amused smile. During all this maneuvering, Rover would be near at hand, and though he never deigned to join in or have anything to do with Lady, he nevertheless was in his own way very proud of her and never allowed any other dog on the grounds. Lady had a faithful guardian in him.

Baby's play pen was usually placed within reach of Lady's chain, and great was Lady's delight, when the baby was not there, to sneak in between the bars and steal some of her playthings. Once or twice she forgot which bars to use as an exit and had to be disentangled. We never feared lest she hurt the baby, for such was her fear of the baby's quick movements and, indeed, of sounds of any kind, that she never came near the child even in curiosity. One day, when no one was looking, Lady stole into the pen and made off with a small, white Teddy bear. This, she pretended to herself, was a small rabbit or even perhaps a wood mouse, for she stalked it slowly, crouching in the grass now and again and then creeping up an inch at a time. Then with a sudden spring she was upon it. Thereafter ensued a comedy of worrying her prey, picking poor Teddy up in her mouth, throwing him some distance away, and then springing upon him again. For some time she played, but finally, a bit tired of this form of amusement, she dug a hole and buried Mr. Bear.

Lady began to grow up. She lost her fuzzy fat figure and entered upon the lanky stage of adolescence. But though her legs were long and thin, and her body straight and slight, and though her tail still seemed to be several sizes too big for her, her head still kept its beautiful symmetry and her big brown eyes their mischievous twinkle. She became more used to having people around, but, in spite of every effort to tame her, she hated to be touched by a human hand. She was tame just so long as she felt herself free on her chain or in her cage, and she was enduring when I held her in my arms or on my lap, but that was all.

"A ROGUISH TWINKLE IN HER SOFT BROWN EYES"

One evening we brought her into the house and let her run around. Evening was now her play time, as she drowsed all day long. Even at first she was not frightened by the strangeness of her surroundings, and thoroughly enjoyed herself. She made a tour of investigation in all the rooms, trying out the various articles which she could later steal off with, and pulling the cushions off the sofa. After a while she settled down to rest near Jill and Rover. Not for long could she be quiet, however, for soon she got up silently and sneaked around behind Jill to startle her out of her nap by a sudden jerk of her tail. Then off she pounced. She darted around a vase of flowers on the floor without disturbing it, but she succeeded in drawing a relieved sigh from us when she was safely past. Then with a rush from the other room, she sprang up to the back of the sofa to teeter a moment on her precarious perch beside me. She was off again without even catching her claws in the lace doily. It is still a marvel to us how she could move so swiftly and silently without ever disturbing a rug; how she could spring high into the air and land again with hardly more than a soft suggestion of a thud. Our collies generally turned the room upside down with their lumbering playful riots.

One evening Jill lay asleep near the fireplace, apparently dreaming of an imaginary race. One twitching paw so intrigued Lady that she crept up and tentatively took it in her mouth. My heart stood still. I knew all too well how sharp those teeth were, but I was loath to warn Jill as I wanted to see what would happen. Jill jerked her foot, and instantly Lady turned a backward somersault and disappeared around the corner. But not for long, soon she crept up again for another attempt, this time waking Jill enough to cause her to stretch, an action which discouraged Lady's bravado and turned her thoughts to other mischief. Upstairs she ran, and after some moments of uncertainty and quietness I became uneasy and followed. Well it was that I did, too, for already our bedroom slippers had been shifted from the bathroom to the sleeping porch, and our quilts were journeying floorward. Mischief was Lady's middle name.

One day we left for a short vacation. We returned to find a hole gnawed through Lady's cage, though we had thought it impervious to teeth. Lady was gone. We like to think that she missed us and so she left, but more likely the call of the wild came and our little Lady answered.

Brachyceratops—The Smallest American Horned Dinosaur.

By Charles W. Gilmore

Curator of Vertebrate Paleontology, U. S. National Museum

THE GIANT and the pygmy members of a race usually excite more interest than those of intermediate stature, a fact as true among the long extinct dinosaurs as among other races of animals.

Triceratops, the largest of the Horned Dinosaurs, will also be described in this series of short articles, so that now we may well consider the smallest American member of this interesting group of extinct reptiles. This animal is called *Brachyceratops,* meaning short-horned-face in allusion to the shortness of the face portion of the skull. It has a length over all slightly under six feet, and stands two and one-half feet high at the hips. The reader may think it quite a good-sized animal when contrasted with those reptiles living today, but its entire length is less than the average skull of its big relative, *Triceratops.*

Brachyceratops is comparatively a newcomer in scientific circles, its remains having been first found on the Blackfeet Indian Reservation in northwestern Montana in 1913, where the skeleton parts of five individuals were uncovered in a small area of less than twenty-five square feet in extent. None of these specimens was complete, but all were of the same size. By using the most complete skeleton as a basis and supplying the missing parts from the other individuals found in this one deposit, it was possible to assemble quite a complete specimen.

This animal lived in an earlier part of the Upper Cretaceous geological period than the better known *Triceratops.* While *Brachyceratops* cannot be regarded as the direct progenitor of that animal it may represent the ancestral group from which the last of the Horned Dinosaurs was descended.

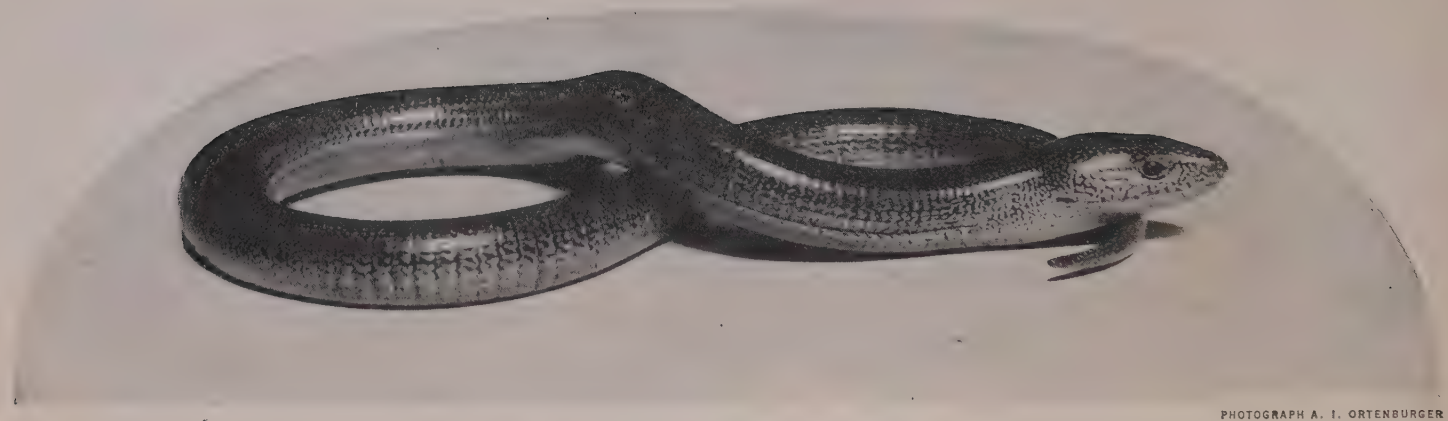
The skull of this animal is only twenty-two inches long and is surmounted by the usual three horns, a tiny one above each eye and a very large one on the nose, just the reverse of the horn arrangement on the *Triceratops'* skull. In life these bony cores were doubtless sheathed with horn but whether they were shed periodically there is no way of knowing.

While *Brachyceratops* is the smallest Horned Dinosaur yet found on this continent, the remains of a still smaller one have been discovered in the Gobi Desert in Mongolia. This particular dinosaur is known as *Protoceratops* and the dinosaur eggs so widely heralded in the press are attributed to this animal. These eggs, we are told, were found together in lots of from five to nine in a nest, and if these represent the full complement laid in each case these animals were less prolific than the crocodile which lays from twenty to thirty. The eggs are cylindrical in shape characteristic of many birds and reptiles, and vary from six to nine inches in length. Their discovery settles the interesting point as to whether dinosaurs reproduced living young.

BABY OF THE FAMILY, AS DINOSAURS GO

"Brachy," to be familiar, was only about six feet in length and the smallest American horned dinosaur.

In the life restoration of *Brachyceratops* an attempt has been made to indicate the nonimbricating scale-like texture of the skin, and while nothing is known of the hide of this animal, skin impressions of other Horned Dinosaurs show scales It seems fair to assume the same for *Brachyceratops.*



PHOTOGRAPH A. I. ORTENBURGER

THE GLASS-SNAKE IS REALLY A LIZARD

The old belief that it can break itself into bits and mend itself at will is another "old wife's tale."

The Truth about the Glass-Snake

By Doris M. Cochran

United States National Museum

STRANGE fables readily attach themselves to wild creatures which are a little mysterious to the casual observer because of their retiring habits and timid natures. Concerning the "glass-snake," the story has often been related in all good faith that this creature can break up its body at will into small pieces, and then at leisure put itself together again, and go on as good as new. There is also a myth about the fabulous "horn-snake," said to possess a hard and sharp horn on the end of its tail which produces a very virulent poison. A young tree struck by this horn is instantly pierced through and subsequently withers and dies because of the poison it received from the horn, so the story goes. Needless to say, these tales are erroneous as they stand, so let us have the truth about the habits of the glass-snake.

Superstition and misinformation have woven many weird and untrue tales about natural life. The reptilian world has been fertile field for these stories, such as the hoop snake fantasy and the tale of the snake that milks cows. Here Miss Cochran explodes another persistent untruth.

To begin with, the glass-snake is not a true snake at all, but a legless lizard. The scientific name of the glass-snake is *Ophisaurus,* which means literally "snake-lizard." True snakes never have a movable eyelid, while most of the lizards do have eyelids. The *Ophisaurus* has very complete upper and lower eyelids, but in closing the eyes, in lizards as in birds, it is the lower lid which comes up and covers the eye, instead of the upper lid which closes down as in mammals. Also, true snakes never have an ear-opening, while in the *Ophisaurus* the aperture leading to the ear-drum is very apparent. The fact that this lizard has no legs can be explained by the fact that he has no further use for them, since he has taken exclusively to a burrowing life and lives by choice in loose earth, under decaying bark and in rich loam of places where plentiful supplies of insects may be found. This legless lizard has a near relative called the Alligator Lizard, living in the western United States, which rejoices in a full set of strong fore and hind legs and scampers about as merrily as he pleases on the dry, sandy areas where he prefers to make his home.

Now as to the contention that the *Ophisaurus* can break himself into little pieces and then mend himself again! When pursued by an enemy, which in the case of the glass-snake is usually a large king snake or a small mammal, the lizard tries to slip away among the grass and hide among the debris. But as his enemy can travel much faster than the lizard himself, he is in danger of being caught except for a wise provision of Nature. When cornered too closely, the lizard can with a sudden twist cause his tail to snap completely off. The tail thrashes about and wriggles and quivers for awhile with nervous twitchings, so that the enemy falls upon the tail, while the lizard itself glides off inconspicuously, and very shortly a new tail grows where the old one came off. But it never has the same color or shape as the other one. The original tail was quite long, and became fine and tapering toward the tip, and was colored like the body, a sort of metallic olive green with a bronze stripe down each side. The new tail is always shorter and stubbier, while the color difference is often quite striking, the regenerated tail being cream-colored or light brown, in sharp distinction to the typical darker coloring. The scales are also not as even as those on the original tail. This queer structure does look very much like a horn on the end of the tail, and it is no wonder that the hasty and fearful glances given to this reptile by our credulous ancestors made them invest it with all sorts of imaginary baleful properties. But the reproduced tail is no harder than the rest of the animal's body and could not possibly penetrate the tough bark of a vigorous tree, as the lovers of the marvelous would have us believe.

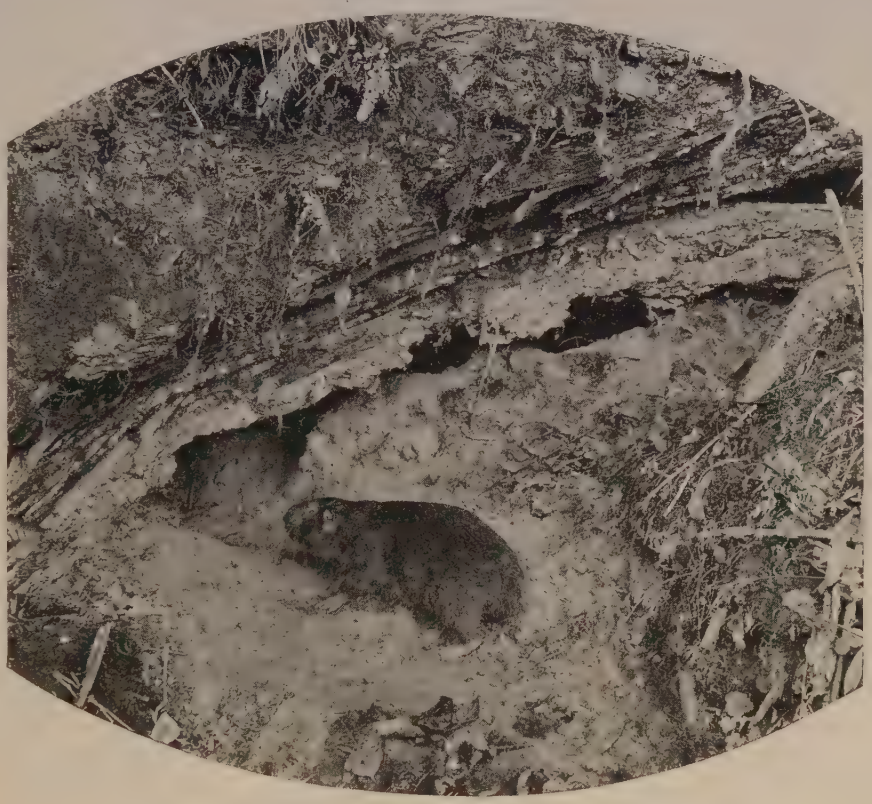
If the body of a lizard is accidentally broken in two, the animal will die. The loss of a tail is seldom fatal to any reptile, and many other lizards besides the glass-snake have the same power of regenerating the tail. In fact, a very slight injury to the tail is sometimes enough to stimulate the production of a new tail at the point of injury, so that the old one gets well and the new part continues to grow until the tail presents a perfectly forked appearance.

The Beaver That Is Not a Beaver

By Theo. H. Scheffer
U. S. Biological Survey

WHEN the Lewis and Clark expedition first entered the country of the Chinooks, on the lower Columbia, the red men offered them in barter robes made from the skins of a little animal that was new to the explorers—new to science. Up and down the Pacific coast the several tribes, as noted later, seemed to have too many names for the creature, a fact which we can best account for by the average white man's drowning grasp at the guttural sounds of the Indian tongue and his ineffectual attempts to record them in his journals. Instance: Showt'l, O-gwah-lal, Oukala, Swakla. . . .

However, the name Sewellel finally came to be used in written accounts of this rodent, although later knowledge indicates that this term originally applied to the blanket or robe of skins, not to the animal itself. The Nisqually tribe calls it "Sh'auch," as nearly as the writer could gather from the explosive rumblings of Indian Dick, repeated several times. On another occasion an educated, citizen Indian of this tribe, being questioned, gave the animal the same unearthly designation, and explained, moreover, that the term meant to sneak or crawl through the low jungle of greenery characteristic of the northwest coast country. Well and good! The animal does that —and more.



AT THE ENTRANCE TO HIS BURROW

These animals are the hermits of the forest although now and then many homes are found in one vicinity.

White men have attempted to improve on the name by substituting Mountain Beaver, Whistler, and Boomer, all of which are inappropriate, as we shall see later. But we will use the first designation, and proceed.

The mountain beaver resembles, as much as anything, a tailless muskrat in size and general appearance. It has a tail, to be sure, but it is so short and well furred as to almost escape notice. The body, which thus appears stocky, is about a foot long, and the fully grown animal weighs a little over two pounds. The ears are very short and the small eyes lusterless—not bright and snappy like those of rodents that are abroad much in the daytime.

The faunal tree of this particular rodent has taken root only on the Pacific coast of North America, from about the region of southern British Columbia to northern California. In certain parts of the Puget Sound country the woods are literally full of them, for they are by adaptation creatures of the forest. Here they are at home anywhere, but choose particularly the hill-slopes and sides of the numerous gulches for their abiding. Since the country has become pretty well settled up in parts the little animal has moved into the second growth on cut-over lands and old burns, which really furnish more food and shelter than did the forest primeval.

Like a briar patch to the cotton-tail of the south are the logs, stumps, brush piles, and low undergrowth to the mountain beaver. Under it all his burrows ramble interminably among the roots that penetrate the glacial moraine. Though not in any sense an aquatic animal, he is never far from the sound of running water in this land of many clear streams and sparkling rivulets.

The mountain beaver is not at all particular about his food, except that it must be green vegetation with a few roots for dessert. In the summer he will cut and drag to his pantry almost any green thing that grows within reach, whether herb, shrub, or plunder from a garden. This we learn from a critical inspection of the plant growth in his haunts and by sorting over the stores which are cached temporarily at the burrow entrances. Even devil's club, skunk cabbage, onions, and rhubarb are to be found in the commissariat. In winter the mountain beaver forages for ferns, salal, Oregon grape and other low-growing evergreen stuff, or climbs the slender saplings to a height of several feet for twigs of cedar, fir and hemlock. In accomplishing this feat it uses for the rounds of its ladder the stubs of the small branches that have been severed; for the little animal is not an expert climber and does not risk heights of more than ten or twelve feet at the most.

The mountain beaver has been credited by many observers

with "making hay" to store in its underground "mows." It appears, however, that the neatly arranged little piles of vegetation left to dry in exposed situations are intended to be used for nesting materials. At any rate, we have found these dried ferns, grasses, and herbs used for this purpose in the commodious underground chambers where the animal spends its leisure hours. The nature of its food is such that supplies cannot be stored very long. Thus we note at the back doors of the burrows—"kick-outs," the boys call them—spoiled food stores among the other debris thrust out on house-cleaning days. For the animal seldom eats in the open, but sections the forage dragged to the front door into convenient lengths to be taken back into the security of the burrow.

In disposition, mountain beavers appear to be rather grouchy; perhaps because they are not keen sighted and are suspicious of any sudden movement or slightest touch. They are hermits of the forest and don't care who knows it.

Though night prowlers in general habit, one may see much of their activities if he will lie low in their haunts, especially in the hour following sunset. They have little to say, but much to do, particularly in the way of cutting forage and dragging it to their burrows. The only sound they ever make is a resentful squeal when one interferes with the other, or when in captivity an observer obstructs their movements. The whistling note credited to them, on surmise, may be charged to birds, or to the marmot; and the booming sounds they are supposed to utter may be traced to the dismal hootings of the sooty grouse. We pause here for reflection on the marvel of Nature—that the melancholy love-song of this bird, coming from the indefinite somewhere in the gloomy depths of the spruce forest, can awaken any considerable flutter in the breast of his prospective mate.

A BEAVER-STRIPPED FIR

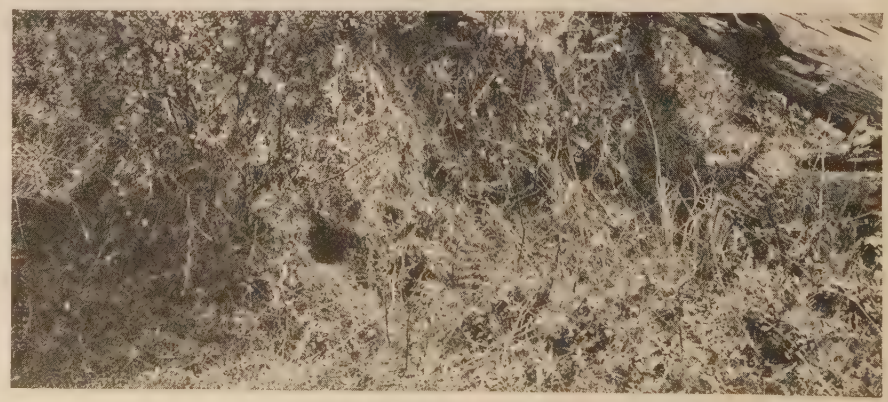
The animal will climb slender saplings, using the stumps of the gnawed limbs.

In dealing with things outside the realm of his everyday experience the mountain beaver appears to be rather stupid. He will enter a box-trap several nights in succession after being released each time in an apparent panic of fright. Shortly the experience gets to be a habit, and he will return from the burrow and enter the trap again as soon as the observer has reset it. When brought from the woods and dumped out of a gunny bag into a fenced enclosure, he will eat clover from your hand or inspect you closely with seeming unconcern. At the slightest movement, though, he will quickly scuttle to safety.

In its nocturnal excursions the animal not infrequently wanders about the lighted streets of the smaller towns or city suburbs and has been known to climb over porches and even enter open doors. Alack for its safety; it hasn't yet learned to dodge the swiftly moving traffic on country roads, and many a mountain beaver out for the night doesn't come home until morning—nor even then!

In speaking of the mountain beaver as a hermit, we do not mean to convey the impression that each member of the tribe lives solitary and alone. In fact, their burrows are sometimes so close together as to fairly honeycomb the ground. Each individual's activities, however, seem to concern only itself, and are in no way related to the common good. In other words, they are not social in their habits. When kept in captivity they do not huddle together in their common plight, but resent fiercely the slightest contact each with its fellow. Strangely enough, too, when one considers the rough environment of their existence, they do not endure captivity well, even when kept in better quarters than they had at home and fed on the same kinds of food they were used to getting in the wild. They get along nicely in roomy outdoor enclosures, but attempts to ship them to eastern zoological parks have so far proven failures.

To the rancher who has a small clearing in the woods or to the city dweller who seeks freedom and quiet in his summer camp, the mountain beaver is at once a source of amusement and a nuisance. Becoming more or less familiar with his human neighbors, the little animal will fool around the premises at night, upsetting things or dragging off food supplies and giving the awakened sleeper the impression of more serious business afoot. Not only that, but the busy prowler is forever roiling up the spring or diverting the water supply that is one of the chief assets of the place.



ENTRANCE TO THE BURROW

The mountain beaver is a nuisance to the camper, making himself at home in the camp and helping himself.

The family of this animal generally consists of twins or triplets which are born in April, in the

Puget Sound country. They are reared in nests of dried grasses, ferns, and leaves within expansions of the burrows under the shelter and protection of logs and stumps, or perhaps the root mass of a fallen tree. By midsummer the young are abroad to some extent, but they do not attain full growth and development until the following year.

Up to date only, it is safe to say, the mountain beaver has managed to save both its hide and its bacon from commercial exploitation under any name that would camouflage their identity. The Indians of the west coast have always eaten the flesh of the animal and pronounced it good. But then you cannot always take the word of the red man at face value in such matters. The meat may have supplied the vitamins lacking in the salmon and huckleberry diet of the coast tribes, but it has not gone into the white man's pot to any considerable extent. There is a certain rankness about it that is too pronounced to be considered just "gamey." Proper cooking might eradicate this—we haven't tried it.

As to the pelt of the animal, it has not yet been utilized in the trade, although the Indians apparently made good use of it in the economy of their simpler existence.

The Southern Sea Elephant

By Edward A. Preble

THE SOUTHERN Sea Elephant (*Macrorhinus leoninus*) is an inhabitant of certain islands in the Sub-Antarctic region. The ones here pictured are lying on the beach of Macquarie Island, southward of Tasmania, now one of the principal breeding grounds of the species, which was formerly abundant throughout the south-parts of the Pacific and Indian Oceans. Practical extermination of the fur seals in those waters caused the sealers to turn their attention to the Sea Elephants, and these also were soon greatly reduced.

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PENGUINS AND SEA ELEPHANTS

The inert gray hulks are not rocks but the Southern Sea Elephants sharing the beach on Macquarie Island with Royal Penguins.

Oil is the sole product sought and this is obtained by trying out the blubber of the great creatures, which attain a length of upwards of twenty feet. The sealers are said to kill only the adult males, a practice which, if strictly adhered to, will permit exploitation of the rookeries indefinitely without endangering the species, since a fresh supply of males reaches the breeding age each year, sufficient in all probability to insure the continued existence and even increase of a species so highly polygamous.

Sea Elephants breed after the manner of fur seals and sea lions, each old male maintaining a harem varying in size up to forty or more females. The males reach their stations in September, the early spring of that region, and are followed a little later by the females, which give birth to a single young one a few days after reaching the rookery. The young are black, in marked contrast to the grayish brown of the adults. They are suckled for several weeks before they are old enough to enter the water and shift for themselves.

The Sea Elephant is so-called from its peculiar facial development, which in the adult male assumes a proboscis-like form bearing a fancied resemblance to the trunk of an elephant. This likeness is so remote, however, that the name may be better considered as due to the desire of the early explorers to give to the creatures of the sea names suggesting land animals. The subject of this article, exhibiting the extreme of nasal development known among the seal-like animals, naturally was called the Sea Elephant. Another closely related species, inhabiting certain islands off western Mexico, is just now the subject of special protective measures instituted in the hope of saving it from extinction. The food of these animals consists mainly of cuttlefish and related forms, so that they are not destructive to man's interests, but the oily product of their huge bodies provides a lure which has almost resulted in their annihilation.

The birds so confidently sharing the beach with the Sea Elephants are royal penguins, which breed only on these islands and in immense numbers. The lack of fear shown by these birds toward the Sea Elephant is in marked contrast to the terror inspired by its relative, the so-called sea leopard. This seal subsists to a very large extent on the penguins which live in constant dread of it, and with good reason.

COURTESY PENNA. DEPT. FORESTS AND WATERS

WINTERGREEN IN FRUIT

The leaves contain an oil from which aspirin may be made by the chemist.

Chemistry and the Forest

By J. T. Auten

Professor of Chemistry, Pennsylvania State Forest School

CHEMISTRY has invaded the haunts of Robin Hood, and we find in the deep woods—the back woods, if you like—awaiting our magic touch, the drugs of the pharmacist, silk for the loom, explosives for the mine, sweeping compound to clean our floors, alcohol for power, and other products, the enumeration of which would tire you by its length.

Now the forester is not only resourceful and independent, but with his natural idealism he is practical. It interests the forester to know that nine million tons of sawdust and seventeen million tons of wood are wasted each year; enough to produce six hundred and eighty million gallons of ethyl alcohol, make sweeping compound to clean all the floors on the globe, or create enough explosives to blast out ten Panama Canals.

Waste to the forester is a sin. President Coolidge says that saving is practical idealism. The desire for a remedy for this waste is assured in the true Nature lover when he realizes the tremendous amount of waste in woods operations. He is ready and receptive for any plan whereby he can save our fast disappearing forests. Think of the long, long hours, weeks, years of stored sunshine gathered cell by cell, wasted, thrown away—lost forever! We have been prodigal indeed in our waste of timber. If we are to carry out a true conservation program, we must save our timber and at the same time salvage the waste. To the chemist we must turn for aid in solution of the latter problem.

WILL THIS BE WASTED?

The sawdust pile of a stave mill, representing thirty per cent of the log. The chemist can use this.

The forester is a Nature lover, too; he loves his woods and the flowers and animals in them. He may think he is not interested in chemistry, but when he learns that the black birch as well as wintergreen leaves contain oil of wintergreen, and that from it aspirin may be prepared, he is interested. Aspirin from the woods!

How would you tackle this problem? To delve for a moment into a chemical process, let us recall the old birch still on which we as boys cast fascinated if disciplined and reproachful eyes. In the bark of the black birch and in wintergreen leaves is an oil. This oil is composed chemically of one part wood alcohol and one part salicylic acid, with one part of water removed. It is called methyl salicylate or wintergreen oil. This oil may easily be removed by boiling the bark or leaves and catching the steam distillate. The oil carried over in the steam condenses as the steam condenses. This oil is heavier than water, so it settles to the bottom and remains when the water is poured off. Our first problem after we get the oil is to remove the wood alcohol from it. Boiling with a solution of caustic soda or common lye in water will split the compound. The wood alcohol boils off and leaves behind the salicylic acid combined with the lye. To change the consequent salt into free salicylic acid we must next add dilute sulfuric acid and boil the mixture. The sulfuric acid takes the lye or soda away from the salt and leaves free salicylic acid in solution. As soon as the liquid cools, the salicylic acid crystallizes out in beautiful feathery white crystals and may be

filtered off and dried. We have completed the first step and have extracted salicylic acid from the raw products of the woods. What shall we do next?

Aspirin is vinegar or acetic acid joined to salicylic acid. How shall we get acetic acid from the woods? Simple enough. Sawdust when strongly heated away from the air is decomposed and gives off acetic acid. This acetic acid may be caught in lime water, boiled down, and liberated with sulfuric acid in much the same way as we did the salicylic. The acetic acid may now be mixed with the salicylic and boiled. The two chemicals gradually combine to form aspirin. When the resultant substance is allowed to cool from hot water solution it crystallizes out and may be filtered off and dried. We have gathered aspirin from the woods.

COURTESY PENNA. DEPT. OF FORESTS AND WATERS

A STOREHOUSE OF ASPIRIN

Young black birch of an age and size suitable for distillation into a valuable oil.

Nebuchadnezzar was cursed for seven years to go and graze in the fields. Poor fellow! If he were alive today, he probably would go to the woods and make his food. Sugar from wood? Yes, of course, and he might even go so far as to change the sugar to ethyl alcohol and drown his troubles in a soft pine or hard oak "jag."

The scientist and the layman, too, forget that the forest is one of our most efficient power plants. What factory is there today which can take pure water and carbon dioxide gas—the gas which we breathe from our lungs—and make from it sugar, starch, coloring matter, perfumes, wood? The *forest* does it. During every hour of sunshine on every square inch of surface of the green woods the little factories in uncounted billions are storing up energy. By some process, we as yet do not understand clearly, the leaf takes one part of carbon dioxide gas and one part of water, expels one part of oxygen and makes formaldehyde. Six of these formaldehyde bricks are laid together and we have sugar. The plant is very provident, too. It dries the sugar for better keeping by removing water and changing the sugar into starch or cellulose.

Do we need to tap the sun's energy? No; we have it gathered for us and dried. All we need to do is wet the dried product and it reverts to sugar. Of course, the water is not just moisture as is moisture in a sponge. It is an integral part of the substance, and we need to use strategy in reintroducing it. Sawdust or wood scraps heated under pressure with dilute sulfuric acid have the water returned to them and become sugar. The acid is removed with lime and the clear sugar solution evaporated or fermented. In the latter case, ethyl alcohol may be distilled off. As high as forty gallons of ethyl alcohol have been made from one cord of wood.

The deeds of science are often framed in a setting of romance. How often has it been so! How interwoven and entwined in the loom of romance are the threads of chance. The reward has often been to the unskilled but observant worker. We seek for one thing and find another. The ignorant plodder sometimes stumbles over doubloons in the realm of science. Saccharin was discovered by mere chance during the search for another product. The value of quinine was revealed by chance. Celluloid was first a revelation of that same wheel. European chemists were looking for a plastic substance capable of being molded and having the nonconducting nature of wood. Nitro-cellulose and camphor gum were mixed together with various substances in an effort to make them homogeneous. Their efforts were unsuccessful,

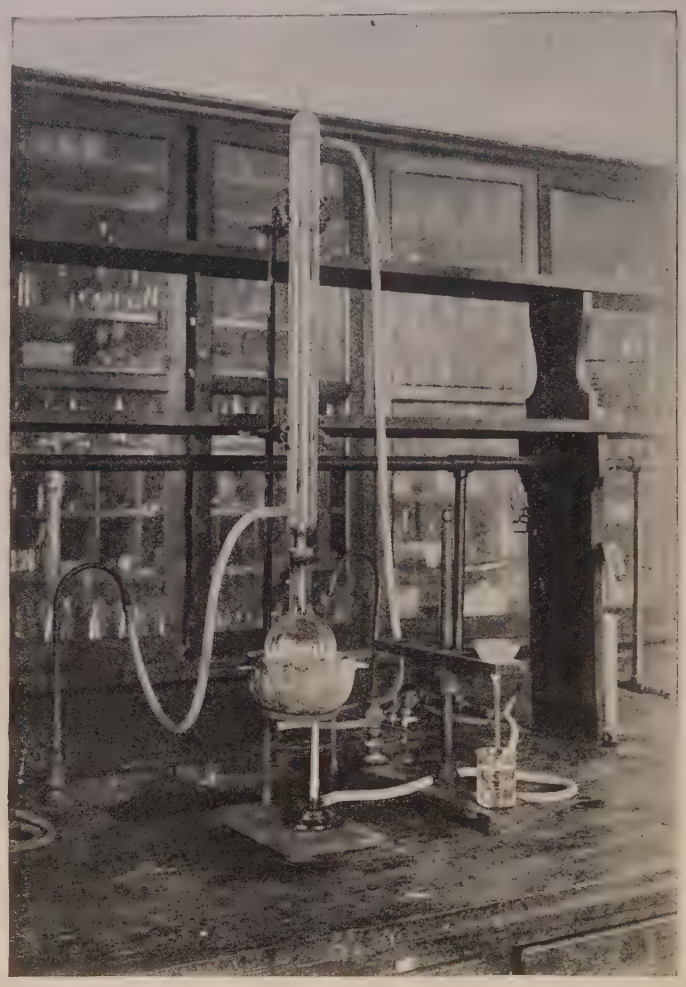
COURTESY PENNA. DEPT. OF FORESTS AND WATERS

SPRUCE—POTENTIAL SILK DRESSES

The spruce of today, at the beck of the chemist, clothes mankind in the silken riches of the Orient.

Hyatt Brothers in this country, during their tests, unwittingly left out the cementing material. The result was that in ignorance they accomplished what the trained chemists failed to do. Celluloid is a solid solution of nitrated wood or cotton fiber in camphor gum. Nitro-cellulose or guncotton is prepared easily by treating cleaned washed wood fiber with nitric and sulfuric acid. After washing, the resultant product may be moistened and ground with camphor. When heated and subjected to pressure the mass becomes homogeneous and the result is celluloid.

Instead of pressure and heat the cold process may be used. In this case the mixture is moistened with ether and alcohol and rolled out or pressed into molds. Ordinarily we think of wood as solid and unyielding with a lack of plasticity. Chemistry has taken the brittle wood and changed it into a plastic mass from which may be molded beautiful articles for the boudoir, transparent curtains for the auto, handles for knives, toys, and a thousand other interesting and useful products. The body of the silent tree of the forest may be transformed into the film by means of which we see the doings of the world on the silver screen. Moving picture film is cellulose or woody fiber changed by the simple process of nitration or acetylation into a plastic mass and rolled into the transparent band upon which are recorded by the photographer the art of your favorite stars.



THE POWERFUL TOOLS OF THE CHEMIST

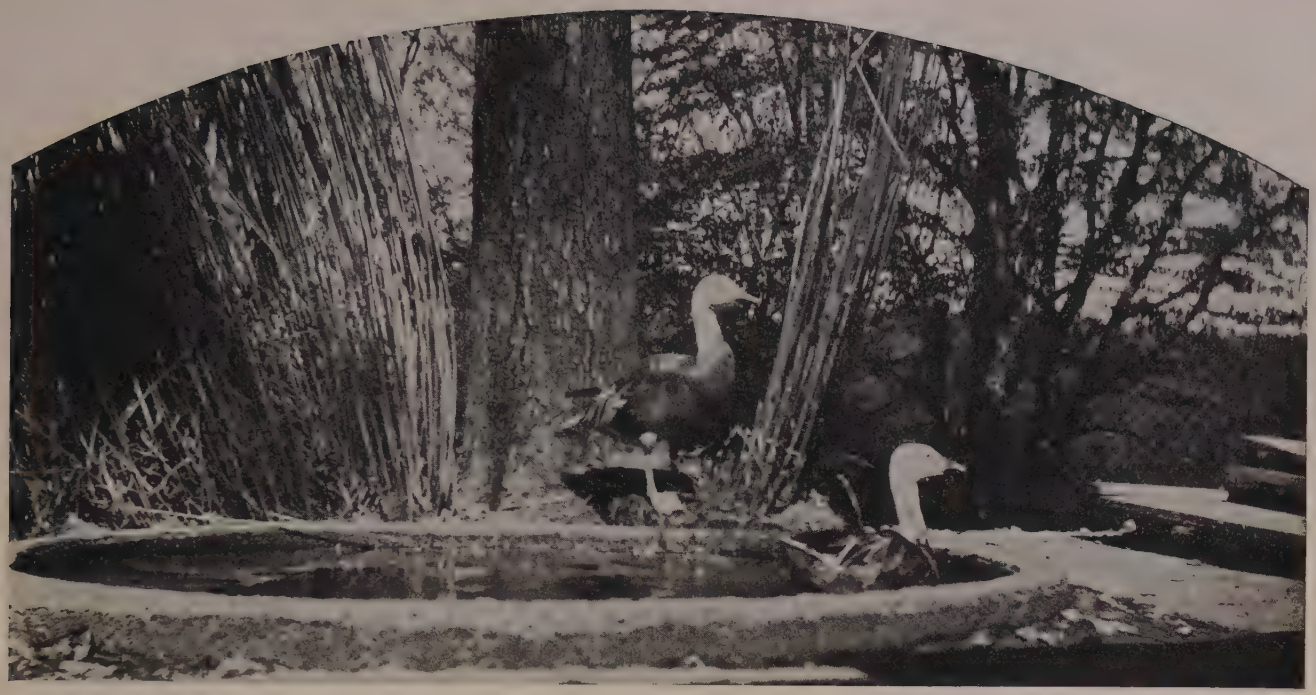
With such as these, forest wealth and forest waste may be transformed into use.

Silk has long been a symbol of riches—the silk of the Indies, frankincense and myrrh, spices, tinkly temple bells. Silk!—who would expect to find it in the backwoods? Chemistry has done so. The chemist has waved his wand, and the whispering of the forests of spruce is changed to the silken rustle of the bridal trains. What an enchanting possibility for the student of chemistry—science, imagination, handicraft in one! The old sawdust pile furnishes the raw product. A mixture of nitric and sulfuric acids the agency, and our sawdust is changed into a substance which, when dissolved and forced out through a small tube, becomes a thread of silk. The forests came from Birnam wood to Dunsinane with direful results. The spruce of today comes forth at the beck of the chemist and clothes the happy millions in the riches of India.

Can we escape the rebound from the destruction of our forests? The conservationists are trying to absorb the shock; the chemist is softening the recoil. The chemistry of the forest piques our interest in its beautiful and useful products; it must stimulate our desire to see its application; it must fire us with determination to forget prodigality and turn to the saving goal of conservation. But wait! It must pass another and more searching test—it must be weighed in the balance of cost and worth. In cold, hard facts, what does chemistry mean to the forest in dollars and trees? It means just this. By saving waste sawdust and other wood refuse, the chemist can add to the utilization of our forests fully 25 per cent. That is, he can expand our forest area, as far as wood products are concerned, about one hundred million acres without planting a tree. He can add potentially to our forests an area whose products in terms of lumber would mean approximately ten billion board feet per year. This lumber would build a million comfortable cottages—homes for three-fourths of New York City's millions or homes for the inhabitants of two Chicagos. Surely the chemist is becoming some forester!

PHOTOGRAPH CORNELIA CLARKE

THE THRIFTY ANT LAYS IN A WINTER SUPPLY OF FOOD.



PHOTOGRAPH BY THE AUTHOR

ACTORS IN THE ZOOLOGICAL PARK DRAMA

The blue geese in Washington which have made history in ornithology. They are listening to the passing of an airplane overhead.

A Two-Century Wild Goose Chase

By Ethel I. Mason

One of the things which makes bird study fascinating is the frequent elusiveness of facts. In this story of the blue goose we have one of these instances. The tale, as well, sheds some new and interesting light on this bird whose wont it is to disappear into the mists each spring to rear its young "somewhere in the north."

THE QUESTION "What makes the blue goose blue?" is easily answered when it is learned that this prize mystery of the air is considered one of the world's most elusive birds. For nearly two hundred years it has baffled all attempts of scientists to locate either its nest or young, and up to the present moment, no explorer, Indian, Eskimo or other hunter can boast of having secured an egg from the breeding grounds of the wild blue goose.

No one even knows certainly where the breeding grounds are, and up to a few years ago, it was denied by many eminent ornithologists that such a species was in existence. No one had ever seen a young blue gosling, and no one could find the nest, so it stood to reason that "there war no sich animile."

PHOTOGRAPH STANLEY CLISBY ARTHUR

GEESE IN CONVENTION ASSEMBLED

Here are blue, snow, Canada, Hutchins and white-fronted geese fraternizing together at Cameron Parish.

In fact, a majority of folks were inclined to believe that the so-called "blue goose" was simply a young or immature snow goose, in whose company it was frequently found.

The snow goose, as its name implies, is a snow-white bird known to science as the *Chen hyperboreus* or "Goose beyond the North Wind." Quite an ornithological war was raised over this problem, and blue and white feathers flew recklessly about among the various writers until late in the nineteenth century.

Prior to 1700, there had been little more than fragmentary references to the birds of the New World, but the blue goose was more fortunate than most of America's peculiar birds, since it attracted attention even in Europe, for in the year 1750, George Edwards

PHOTOGRAPH G. L. EADIE

TWO EGGS OF THE BLUE GOOSE

Here they are left exposed in the nest, fair prey for some hungry mammal to feast upon.

compiled a most attractive "Natural History," in which is included an unusually interesting account of what he termed the "Blue Winged Goose."

He was the "Library-Keeper of the Society of Physicians" in London, in addition to being an artist of no mean ability, as the illustrations in color in this rare book are delightful additions to the text. He relates of the blue goose, "This Bird was brought from Hudson Bay by Mr. Isham and I believe hath never been described. It is a Bird of Passage, continuing in that country so long as the Waters are unfrozen and returning into Southern Countries when the Frost shuts up its Substance.

"My friend, Mr. Light, has told me, there is a Goose which comes in Summer to Hudson Bay, having its Forehead as if it were scorched with heat, and that the Natives firmly believe that these Geese to avoid the Winter's Cold fly toward the Sun and approach so near that it singes its Forehead against his Orb.

"It is hard to convince these Savages that there are Climates on this Earth warmer than their own to which Birds may fly for Food and Shelter during their rigid Winters. The above description, I think, must be the Bird of which the Natives hold this opinion."

One of the most interesting phases of the blue goose question is the varying tide of reports on the location of possible breeding grounds. Starting from George Edwards' original statement that his specimen was found near Hudson Bay, all the districts in and around James Bay, Northern Labrador and Ungava, as well as the Athabaska-Mackenzie region have been exhaustively combed over by American and Canadian naturalists, in the course of different surveys of those districts.

George Barnston speaks of the bird in his "Recollections," and Edward A. Preble in his report on Hudson Bay states that a specimen from Repulse Bay is listed in the catalogue of the British Museum, and that one from Moose Factory, that was taken in 1860, and another from Fort Churchill, appear in the catalogues of the U. S. National Museum at Washington. At the time Mr. Preble's account was published, nearly a quarter of a century ago, it was thought that species bred in Northern Labrador, but at the present time, scientists seem to favor certain districts of Baffin Land, where a representative of the Canadian government has been making extensive explorations for the past year.

Meantime, a slight step forward has been made in that the National Zoological Park, in Washington, D. C., has successfully raised three specimens of this rare and elusive fowl, and for the third season, has hatched out a young gosling from its parent captives.

Prior to 1924, there was no record at the Smithsonian Institution of any thoroughbred blue geese having ever been reared in captivity, and so the Washington Zoo has made a most enviable record.

Private collectors in various parts of the world have spent small fortunes in attempting to raise young blue geese from adult captive birds, as the only wild ones of that species that had ever been seen were at least four to six months old, at the time of their first visit to the Mississippi Valley, where thousands of the species migrate every winter.

PHOTOGRAPH STANLEY CLISBY ARTHUR

SITS FOR ITS PORTRAIT

The author asked Mr. Arthur for a rear view of the blue goose. Here it is.

It was, therefore, a matter of great interest to ornithologists to learn what the young gosling looked like, after two hundred years' failure to find it in the wild state. Thus the news that there were three young wild blue geese in the care of a Yokohama hen at the park aroused great interest, and their progress was duly watched from day to day by the late Ned Hollister, then superintendent, to whose influence may be traced the success in rearing blue geese at that park.

In addition, these prize wild fowl were cared for by a keeper who has had special success with game birds, such as mallards and wood duck. He had discovered in the hatching of a valuable goose egg that the shell was too brittle for the chick to handle, and had tried

PHOTOGRAPH G. L. EADIE

MOTHER GOOSE TO THE RESCUE

Slipping out from behind the tree, she busily pulls down over the eggs to keep them warm and safe.

the plan of dampening slightly the shells of all water-fowl eggs each day, and thus reproducing the condition which results from the mother goose sprinkling the eggs on arriving back from a swim in the pond.

As rare eggs are invariably placed under hens, for their better safety and protection, this was an important discovery, and saved the day for the three young arrivals.

They were each about ten inches long, and were covered with an incredibly soft down that was dark-greyish olive on the upper parts and yellowish citron on the lower, shading off to a darker hue on the flanks. The under part of the head and throat was a deep-olive buff, while under the chin was a tiny "V" patch of the purest straw yellow, which was of interest since it later changes in the adult to a soft creamy white.

As no specimen of a young chick of this species was then in existence so far as known to the authorities, one of the little group was taken down to the Smithsonian Institution to be kept as a study-skin. The other two goslings grew up together under the guidance of the wise old mother hen, who became their devoted slave.

All blue geese seem to have a sense of humor, or at least, those in captivity appear to have cultivated it, and the two young goslings gave full vent to it in nipping at the ankles of the other young wild fowl or the rabbits, and teasing their foster-mother almost beyond endurance. They held decidedly aloof from the young mallards and wood ducks that had hatched out at the same time, and required considerably less attention and nursing than these delicate little ducks.

For the first few days they ate only kale and lettuce that had been cut up into tiny bits, and refused the usual chick food offered the young ducks. According to the various keepers in the park, wild fowl seem to prefer kale to all other green food, with lettuce a close second and cabbage a very bad third.

After a few days, they wandered at will along the path just outside the barn, where they ate voraciously of the weeds and blue grass, their favorite mixture being plantain seed and later its blossom; narrow-leaf dock, smartweed and above all, its blossom.

AND THIS IS "SISTER"

She is the first wild blue goose raised in captivity in the National Zoological Park in Washington.

A small concrete pond had been built for the youngsters, and at the age of three weeks they threw themselves into it with all the zeal of practiced mariners. However, they were so small that in spite of their energy it required a good deal of maneuvering to get out again, and the performance was watched by their foster-mother with every evidence of distress, as she flew around and around their little ocean in obvious dismay at the sight of her reckless charges disporting themselves on the miniature waves.

It was most entertaining to watch the carefree insolence of the aristocratic blue goslings when their other young associates, the tiny mallards, wood ducks and baby "Jap" hens bustled by in a long Indian file to the call of the feeding

pan. But with the whir of airplanes, these same young aristocrats were the first to join a headlong scramble to reach Lambert, the keeper. All the wild fowl regard airplanes as a species of very dangerous hawk, and the blue geese, in particular, will rush a distance of a block to reach the safety zone as they are taking no chances.

By the age of six or seven weeks they became very fond of their attendant and formed the habit of responding to his whistle with loud, sharp "quacks" as though to say, "Yes. We're here. All's well." This is a pleasing custom still in vogue, and is most amusing to the visitor.

In the fall months the down was replaced by a grayish-brown plumage that varied from deep to soft "mouse gray." The head and neck at this time was of the same hue, which is quite unlike that of the adult bird, which is snow white and which seems to take from three to four years to lose entirely the dark plumage of the immature goose, according to Stanley C. Arthur, Director of the Division of Wild Life of the Louisiana Conservation Department.

PHOTOGRAPH STANLEY CLISBY ARTHUR

TWO GREATER SNOW GEESE

Some claimed that the blue geese were merely snow geese. This photograph was taken at Cameron Parish, Mississippi.

The park authorities considered that the two nearly grown birds would be happier if placed with the other wild fowl of their kind in the main part of the zoo, so in early October they joined their parents and were formally placed on exhibition.

The theory was an excellent one, but it was disastrous in practice, for the older inmates of the wild fowl group at once resented the strange arrivals, and promptly killed the male blue goose that had been raised with such difficulty and with such hopes.

"Sister," the survivor, was immediately returned to her old home in the barn where she still remains under the protection of her friend, Lambert. She hardly misses the large lake enjoyed by the rest of the wild fowl for she never had a chance to use it, and being rather a solitary bird by nature, seems to do very well in the company of the friendly hens.

Since last season, the original specimen has had the companionship of two fine blue geese that were hatched out last year, so that all three birds wander freely and happily about the premises surrounding the barn.

They make a lively trio, and are the pets as well as the pride of the entire park. The male bird, "Alex," is particularly active and even mischievous, and all three of them love nothing better than to give the mallards of the chickens a really good "ragging." Nor are they above lining up in front of the rabbit pen adjoining their own in order to tweak the fur of some happily slumbering long-eared companion.

The real event of the day, however, is the bath. Prior to it is the grand parade, for which Alex and his co-partner in crime, Holly, wait until the mallards are all lined up in family groups, asleep, at the bottom of the hill in the sun. Whereupon he utters a piercing squawk, and joined by his sister, flies head first into the astonished line, scattering mallards like chaff in the wind. . . . This is a game that can be played endlessly, and the worse the enemy are routed, the brighter the day.

The bath itself is a gala affair. There are terrific splashings and exhibitions of fancy diving and somersaults invented for the occasion. Feathers fly recklessly around, and only the arrival of some delicacy like kale is permitted to interfere with this delightful pastime.

Though the blue goose as a species has always been regarded with the greatest of interest, and is considered rare, there has never been any difficulty in noting the adult bird in the winter, for it migrates to the shores of the Mississippi River in fairly large numbers. An ornithologist of the Smithsonian Institution has estimated the known flock to be in the neighborhood of some five thousand birds, but when these are spread out in one patch, they probably appear to be greatly in excess of that figure.

However, they seem to flock in great numbers among the reeds and marshes of Avery Island and Cameron Parish, Louisiana, where they are fond of tearing up the roots of the three-cornered rush, stripping the marshes.

About the middle of March the northward migration begins in earnest, and whereas the snow goose departs for fairly well-known areas in Canada, the elusive blue manages to disappear into the mists shortly after it crosses the border. It is very rarely seen along the Atlantic coast, though isolated specimens are occasionally deposited in museums, or recorded in some journal of ornithology.

Meantime a new little blue gosling arrived at the zoo in Washington this last June. And the work of two expeditions investigating bird life in Canada may be significant. The first was sent north to Baffin Land last year by the Canadian government, at the request of Mr. Frederick H. Kennard, of Newton, Massachusetts, who has been making a life study of *Chen caerulescens*. The second expedition makes no comment as to blue or other geese, and may not reach the blue goose country. If either one of these expeditions is able to solve the mystery of two centuries, and locate a nest of the wild blue goose, it will be a great ornithological victory. But we will never be able to use that good old saying again, "He went on a wild goose chase."

Draco and September's Evening Skies

By Isabel M. Lewis

THE CONSTELLATION of Draco, The Dragon, is one of the five principal constellations known as the northern circumpolar constellations, and which surround the north pole of the heavens. In the mid-latitudes of the northern hemisphere and farther north, they never pass below the horizon and so may always be seen at some hour of the night.

Draco is outlined by a long-curving line of stars of third and fourth magnitude extending nearly halfway around the north pole and passing between the two Bears, Ursa Major and Ursa Minor, which contain, respectively, the Big Dipper and Little Dipper. The star marking the tail of Draco lies nearly on a line with the Pole-Star, Polaris, and The Pointers of the Big Dipper. The head of Draco is marked by a group of four stars in the shape of an irregular quadrilateral and lies beneath the foot of Hercules, the huge constellation to the south. The dragon's body lies between its own head and the bowl of the Little Dipper. The position of the hero's foot on the head of Draco symbolizes his success in slaying the sleepless monster that guarded the tree which bore the golden apples of the Hesperides. To overcome the dragon and pluck the golden fruit was one of the celebrated twelve labors of Hercules.

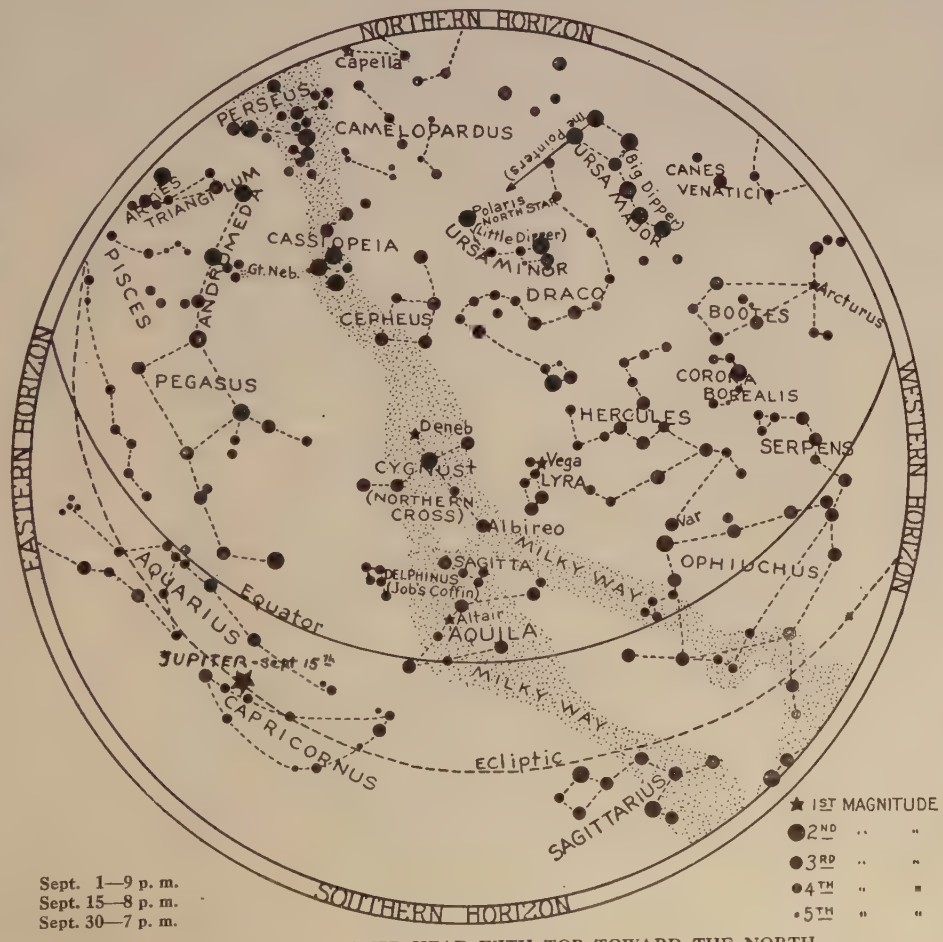
The star, Alpha Draconis, which lies midway between the bowl of the Little Dipper and the star, Mizar, at the bend in the handle of the Big Dipper, is noted for the fact that it was the North Star, 4,700 years ago, and was then less than a quarter of a degree from the true position of the north pole of the heavens. Our present Pole-Star, Polaris, is now about one and a quarter degrees from the pole, but the distance is slowly decreasing and two centuries from now it will be only half a degree from the pole. After that its distance from the pole will increase once more and finally will become so great that Polaris will no longer be looked upon as the North Star. As a result of what is known as the Procession of the Equinoxes, the north pole of the heavens describes a circle around the pole of the ecliptic, and at a distance of twenty-three and one-half degrees from it, in a period of 25,800 years. Stars on the circumference of this circle in turn become the North Star during this period. About 12,000 years from now the magnificent Vega in Lyra will be the North Star, the most glorious of all Pole-Stars!

It is an interesting fact that some of the tunnels in the pyramids of Egypt slope in such a way that at the time when they are believed to have been built the star, Alpha Draconis, was visible from their lower extremities when it crossed the meridian. It is suspected that the tunnels were built with such a slope for the purpose of observing the passage of this star over the meridian.

The brightest star in Draco is the second magnitude star, Gamma Draconis, one of the four stars that

ONE OF THE CIRCUMPOLAR CONSTELLATIONS

In the lore of the ancients this heavenly body represents the dragon, the killing of which was one of the twelve labors of Hercules.



TO USE HOLD MAP OVER HEAD WITH TOP TOWARD THE NORTH

mark the head. There is reason to believe that Alpha Draconis, the former Pole-Star, has decreased considerably in brightness in the past few centuries since it was rated as a star of the second magnitude by ancient and medieval astronomers. At present it is an inconspicuous star of the fourth magnitude but may be easily found from its position halfway between the bowl of the Little Dipper and Mizar in the handle of the Big Dipper.

In September the Northern Cross in Cygnus lies directly overhead at the time for which the star map is given. Vega, the brilliant blue-white first magnitude star in Lyra, will be found directly to the west of Cygnus, and, as it crosses the meridian, passes almost exactly through the zenith in the latitude of Washington.

To the south of Cygnus and also on the meridian at this time is the constellation of Aquila, The Eagle. Its first magnitude star, Altair, is easily recognized by the fact that it lies in line with and about halfway between two fainter stars. The interesting little group of Delphinus, The Dolphin, known also as Job's Coffin, lies a short distance to the northeast of Altair. It may be easily recognized by its diamond-shaped configuration formed by four fourth magnitude stars.

Not far above the southwestern horizon at this time will be seen the brilliant zodiacal constellation of Sagittarius, The Archer, lying in the path of the Milky Way which divides into two branches in Cygnus, one branch passing through Ophiuchus and the other through Aquila and Sagittarius. The little inverted milk dipper in Sagittarius aids one in identifying this constellation. The Milky Way is remarkably brilliant in Sagittarius, and it is generally believed that the center of the vast Milky Way system of stars to which our solar system belongs lies among far-distant star clouds in this constellation.

In Capricornus, The Sea-Goat, visible in the southeast, will be found the brilliant planet, Jupiter, which is by far the brightest stellar object now in view. Jupiter is surpassed in brightness only by Venus, which is still visible as Morning Star.

The planet Mars is now in Aries and will rise shortly in the northeast and remain visible throughout the night. On September 1, Mars is equal to Canopus in brightness and increases rapidly in brilliancy during the month until it becomes equal to Sirius in brightness by the 30th of September. Its distance from the earth decreases from 59,550,000 miles on the first to 47,610,000 miles on the thirtieth.

The planet Saturn is in Libra and is still visible low in the west for two hours or more after sunset. During the first few days in September the planet Mercury may be seen low in the east before sunrise. It may be located with the aid of Venus, which lies a few degrees distant and to the northwest of Mercury. It may be necessary, however, to use a field glass to find Mercury in the morning twilight. Venus is now low in the east at sunrise but will continue to be a fine Morning Star throughout the month.

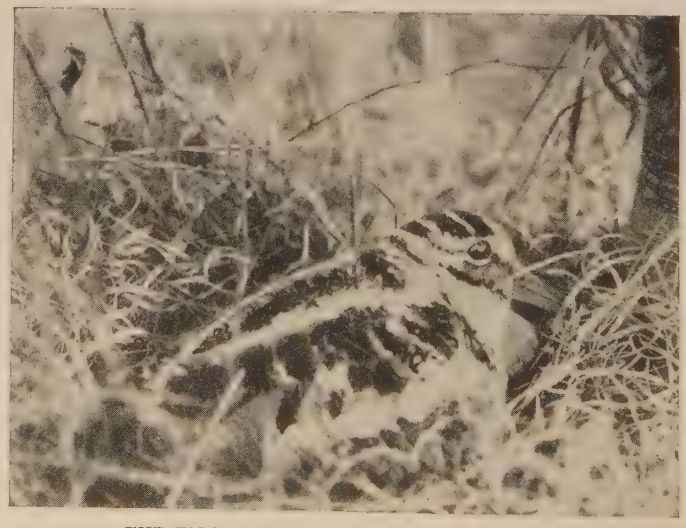
Autumn begins September 23 at 7:27 p. m. (Eastern Standard Time), when the sun crosses the equator going south. Nature will soon hang out her autumn signs.

Getting Friendly with the Woodcock

By S. S. Dickey

SOMETIMES, as one rounds a thicket where, perhaps, a spring oozes sluggishly from the flank of a hillside, one is startled by a sharp, whistling noise. It is the woodcock vanishing amidst the covert in its peculiar gyrating flight. A nearer glance at the spot just vacated will reveal numerous pits or holes in the soft earth where the bird has been drilling for worms and crustaceans.

There are not many places where the woodcock may be scouted with success, but in the narrow mountain valleys at the headwaters of that lovely stream, the Juniata River, in central Pennsylvania, these birds flourish in some numbers. I had settled down at the cabin of a mountaineer. He told me that the house cat had recently come to the door-yard carrying "a strange snipe" in its mouth. He produced the wings, and I went forth into the nearby boggy fields with a keen eye to the woodcock. Late one evening, just as the glowing sun sank over a distant purple range, a dark bird arose from a thicket of red maple saplings and low white pine shrubs. It mounted upward and upward and became a mere speck in the twilight. Then it ceased the ascent and started to circle, at the same time giving vent to a series of twittering notes—the flight song of the woodcock. A nest must be hidden in that vicinity.



THE WOODCOCK IS AN INTERESTING BIRD

She sat quite still on her nest, brooding her treasures, and confident of her protective coloration.

Early the following morning I was back in the bog, searching. At last I found a mother woodcock seated on her nest beneath one of the pines. She sat quite still, confident of her protective coloration. I was able to get within a foot of her body and focus the camera, while she brooded her treasures. But when the shutter went "snap," she was off like a flash and disappeared in the thicket. In this nest were four buff-colored eggs, so spotted as to be inconspicuous amidst the brown pine needles and yellow blades of wire grass which served as the meager lining of the nest so well hidden.

The Tree That Gives the Chocolate

By Otto Wilson

(PHOTOGRAPHS COURTESY U. S. DEPARTMENT OF AGRICULTURE)

From a boyhood on an Indiana farm, Otto Wilson has carried his early love of Nature with him in his work in various parts of the world. Actually identified with commercial study, he has, nevertheless, seen the articles of Nature's gifts to commerce and prosperity through the eyes of a naturalist. Here is another of his Nature economic stories of a tree that gives us our chocolate sodas, candy bars and layer cakes.

OCCASIONALLY in the animal world we find a creature, fine-grained and sensitive, which thrives joyfully in its proper habitat but droops disconsolately or even dies when taken from its familiar surroundings. Something like that is the cacao tree, the tree to which Johnny, curling his legs around the soda-fountain stool, and Johnny's big sister, and in fact nearly all the rest of us ought by rights to give a hearty vote of thanks. From it comes the chocolate candies, the syrup, the cake-filling, and the cocoa that have added so much enjoyment to our modern civilized world.

Born of the tropics, it thrives most happily and produces most bountifully when not too far from the friendly equator. But even when quite at home it is often fastidious and retiring. It does not like the wind—not the sweeping and destructive hurricanes alone, but also the steady moderate winds that frequently blow in the tropics. Exposed to them the cacao tree is all too likely to droop and wither away as if someone had girdled it with a knife. So it seeks a refuge, and it grows most happily in the quiet valleys between forest crowned hills or ridges where the strong breezes and gales are warded off. If the planter cannot find such a location, he provides the shelter artificially by setting out rows of tall leafy trees as windbreaks.

Like its stately neighbor, the coconut, it is fond enough of the sea, but unlike that hardy palm it does not relish having its feet in salt water. Rolling land, a little higher than sea-level but well within one thousand feet, makes the most suitable location for a cacao plantation. The tree desires, furthermore, a fine, loose, humid soil, with no hard clay and no stagnant water, plenty of shade when it is young, and, night and day, the warm breath of perpetual summer.

If the planter can meet these requirements, and, when the trees are grown, fight off the insects and other pests which eat its leaves, the parrots which peck its pods, the grubs which work at its roots, and the blight and fungus diseases which are always ready for the attack, he is likely to reap a bountiful harvest. Formerly, indeed, even this was not thought quite enough. It is recorded that the early Spaniards used to perform religious rites at their cacao planting, and Bancroft, in his book on the native races of the Pacific states, tells of a Maya custom which may have given the idea to the Spaniards:

"Before planting the seed they hold a festival in honor of their gods, Ekchuah, Chac, and Hobnil, who were their patron deities. To solemnize it they all went to the plantation of one of their number, where they sacrificed a dog having a spot on its skin of the color of cacao. They burned incense to their idols, after which they gave to each of the officials a branch of the cacao plant."

When first I saw a cacao grove, coming upon it suddenly while riding on one of the gasoline-propelled railway handcars so useful in roadless Central America, the rows of trees, in point of size and shape, seemed not unlike those of a cherry orchard such as we sometimes see here in "the States." Comparatively small and low-branching, each tree might have been one of the trees in a certain farmhouse yard which long ago harbored one boy and scores of

CHOCOLATE SODA, PLEASE!

Here are the heavy pods of the cacao tree that Nature fixes to the body of the tree by a very short stem.

woodpeckers with every recurrent cherry season.

But in place of the whispering foliage of little leaves I saw big, dark-green leaves many inches across. And in place of the decorative red fruit peeping out everywhere from the foliage I saw one of the most curious arrangements of seed vessels which capricious Nature has ever devised. Directly out of the trunk and larger limbs, as if someone had carelessly stuck them at random into the bark, grew the reddish-brown or yellowish pods, canteloupe-shaped, pointed, ridged, and lumpy-rough. No twig or branch, but only a very short stem, separated them from the body of the tree. So quaint and unusual is the effect when you see them for the first time that your first thought is that some small animal is clinging to the trunk and boring into the bark. But when you take one of the larger pods into your hand you realize that Nature's caprice again has sound, good sense behind it. Hanging on the ends of small branches like apples or pears, these pods would weigh down the branches unendurably and probably break many of them off.

THE TREE THAT GIVES THE CHOCOLATE

Here is the origin of the chocolate bar, laden with its reddish-brown or yellowish pods, canteloupe-shaped, pointed, ridged and lumpy-rough.

Inside the rough pods is the chocolate. But not in the form of bon-bons or lozenges or almond-bars, as you will quickly find out if you sink your teeth in the contents. With a blow from your machete you can slice off the side of the pod, revealing a mass of snowy pulp within, white or tinged with pink, and many rows of close-set beans showing through it. A twist of your knife-point flirts the mass out on to the ground. As a food the rather slimy pulp does not look appealing, but put one of the beans on your tongue and you will find the white substance tasty enough, with a slight acid flavor. Not so the bean itself. Its meat is actually the very substance of the chocolate as we buy it from the candy man, but it has much treatment to go through before it is ready for your enjoyment, and your too-eager desire is likely to teach you only why they call it "bitter" chocolate.

In getting the beans ready for shipment from the plantation two or three simple steps are involved. Men laborers usually break the pods with their cutlasses, while the messy work of picking out the beans from the pulp falls to the lot of the women. These beans, somewhat like an almond or a large Lima bean in shape, are still coated with a layer of the white pulp, and it is this pulp which furnishes the key to the next operation. The beans are piled into baskets and taken to little airtight houses, or sometimes simply covered with earth and plantain leaves. Like any other fruit pulp under similar conditions, the white cacao pulp begins to ferment. After a few days it is all melted and run away, but in the process it has heated the mass to a high temperature, and it is this heat which causes some sort of chemical change in the interior of the bean not very clearly defined. Some of the moisture is also driven into the bean so that it comes out of the "sweating" process plumper, as well as cleaner, than when it went in.

Now comes, on many plantations, a picturesque and novel treatment which is quite peculiar to cacao. The beans are spread out on a flat surface, powdered red clay is sprinkled over them, they are properly moistened, and gangs of barefoot laborers "dance cacao"—that is, tramp round and round over them until the clay is well worked into the moist beans and they take on a glossy appearance supposed to make them much more attractive commercially. No colored West Indian could long engage in rhythmical labor like this and keep silent. From time to time the inevitable chanting song arises, and the onlooker has a slight suggestion, at least, of the weird dances of tribes in the heart of Africa.

Sometimes the women perform the labor of "claying" by rubbing the beans with their hands. "Claying" cacao

has been often condemned as of no value, and in many cacao-growing regions it has been or is being largely dispensed with. Incidentally, the "dancing" need not prejudice anyone against using cocoa or chocolate. The actual meat of the cacao bean is protected against the bare feet of the dancers by a shell which, indeed, is none too thick or hard but is thick and hard enough.

Then the beans are dried, sometimes in the sun, sometimes in special drying houses. They are spread out on trays and turned at the proper time so that all the beans will dry evenly. If the sun-drying process is followed, the trays are often fitted with wheels or rollers so that they can be pushed under cover when the rain clouds threaten, and also during the middle of the day, when the heat, pouring down from the sun overhead, would shrivel as well as dry the beans. Drying gives the beans a rich brown color inside and makes them brittle. Buyers especially like to feel the beans break with a smart snap beween their thumb and fingers.

THE INSIDE OF A CACAO POD

A blow of your machete will slice the side of the pod and reveal a mass of snowy pulp and rows of close-set beans showing through.

When the drying is finished the work of the planter with the cacao is also done. He sacks the beans up and turns them over to the shipper, who sends them to the market or to the chocolate maker direct. The next process is to roast them, which makes them palatable and dries the outer shell until it will easily shatter off. These shells are removed, along with the hard little germ which is found in each bean, and the rest of the bean is then ground over and over again until it is beautifully fine; mixed with fats, sugar, and flavoring material; and shaken or pressed into molds, when it is quite ready at last for your voracious sweet tooth. If it is to go into your cocoa cups a part of the fat, which makes up nearly half the original bean, is taken out instead of more being added.

Peculiarly American is the tree which gives the chocolate. It is interesting to note that of the three great table beverages, tea, coffee, and cocoa, each was given to the world by a separate continent. When Columbus sailed in 1492 Europe knew nothing of either of them. During the next century coffee made its slow way out of Arabia, whence it had come from its birthplace in Africa, and later tea was introduced from Asia. But cocoa preceded them both in western Europe. Columbus took back with him samples of cacao, which America thus dramatically presented to civilization and which she can claim as all her very own.

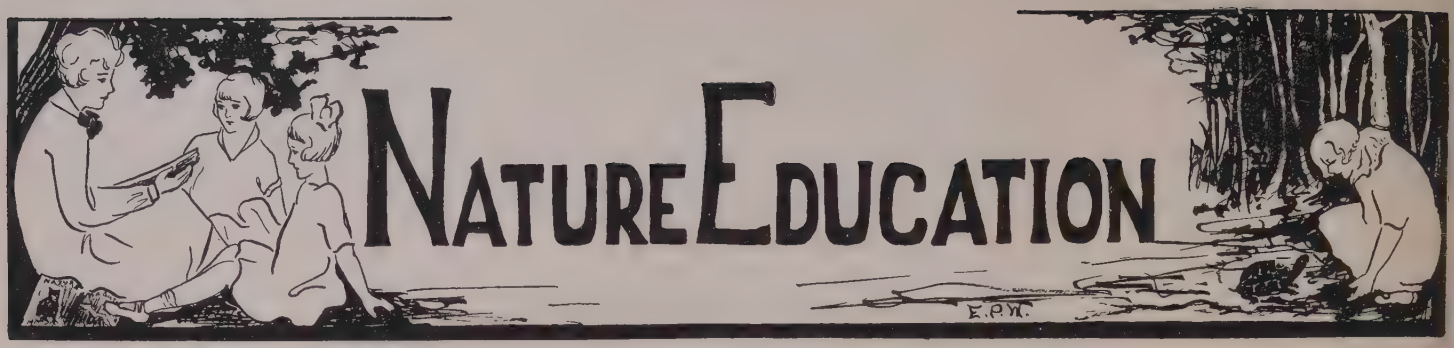
It is supposed that the cacao tree's Garden of Eden was somewhere in that vast jungle of teeming life, the Amazon Valley region. From there it worked its way northward, and by the time the strange sails of the white man's ships appeared off the wild Caribbean coasts it was flourishing as a highly prized luxury among the Aztecs of Montezuma's empire. The beans were used for money, and subject tribes gave immense quantities of them as tribute. Prescott, the historian, describes the drink made from them in a short passage which has been often quoted but which is well worth repeating once more:

"The emperor (Montezuma) took no other beverage than the Chocolatl, a potation of Chocolate flavoured with vanilla and other spices, and so prepared as to be reduced to a froth of the consistency of honey, which gradually dissolved in the mouth, and was taken cold. This beverage, if so it could be called, was served in golden goblets, with spoons of the same metal, or of tortoise-shell finely wrought."

It sounds pleasant enough, although we have to remember that the Aztecs knew nothing of sugar, and we might not have enjoyed it quite so much as they did.

It was these early lovers of chocolate who gave it its present name. To the Mexican word for water, "latl," some imaginative Aztec is supposed to have added the churning sound of "Choco! choco! choco!" which the stone vessels gave out when chocolate was stirred in them, and the resulting delicacy was known first as "chocolatl," then as the European form "chocolat," as it is still pronounced in the Latin tongues, and then as the English "chocolate." But it remained for the great eighteenth century naturalist Linnaeus to characterize it properly. He was so pleased with it that he combined two Greek words into the name "Theobroma," or "food of the gods," and the chocolate tree remains today *Theobroma cacao*.

But alas, America's grip on the industry she gave to the world is loosening. Just as South America has largely taken over the raising of the coffee plant which Africa originated, so now is Africa adopting the cacao tree, the child of South America's soil. Forty-five years ago a native blacksmith named Tette Kwesi went home to the Gold Coast in West Africa from the near-by little island of Fernando Po, where he had been "working cocoa." With him he carried a few seeds of the cacao tree. He planted them in his dooryard, and the trees thrived so well that his neighbors followed suit. The cacao tree had, in fact, found an ideal place in which to grow and spread. From this start the Gold Coast in 1891 sent out a small shipment of 80 pounds of cacao beans, and today the colony yields to the chocolate lovers of the world almost half a billion pounds of cacao beans every year. The fierce Ashanti natives, who as late as 1900 penned up a British garrison in its fort in Coomassie in a memorable siege lasting for months, have taken whole-heartedly to cacao raising, and cacao is reckoned as one of the chief factors operating to civilize these fighting but intelligent savages. In their little home gardens they produce it so cheaply that they have shifted the whole center of the world industry, and the Gold Coast, in a very short time, will probably be supplying more cocoa than all the rest of the world put together. This is the story of cocoa.



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Starting a Tree Nursery

The boys and girls of the sixth, seventh and eighth grades of the Training School of the Illinois State Normal University have undertaken a tree-nursery project which will probably become a permanent feature of the Nature Study program of the school. In their tree study this spring the seventh-grade children collected and planted seeds of the silver maple, American elm, red elm, Scotch elm, and catalpa. Since tree fruits are unusually abundant this year the classes hope to add a large number of species to the list this fall. The plan is to use the trees, when they are ready to transplant permanently, on the campus and on the home grounds of the children of the community.

* * *

Old Weather Maps on Hand

The Weather Bureau cannot afford to send out weather maps to every school in the land; but the Department of Biological Sciences of the State Teachers College of Hays, Kans., has on hand a number of last year's maps which it will gladly send out to schools having use for them for study purposes. Send four cents in stamps for postage, and you will receive five or six maps.

* * *

School-Garden Association Meets

The sixteenth annual meeting of the School-Garden Association of America was held in Philadelphia, June 29 and July 1, 1926. In the conference of the National Committee on Nature Education of which Van Errie Kilpatrick, Direction Nature-Garden Work, New York City, is chairman, a significant program of committee reports and discussions was presented. The topics reported upon were Improving Nature Teaching, Methods of Teaching Nature, School Laboratory in Nature Education, Equipment for Nature Education, Nature Course of Study.

* * *

A Word from the Pacific

Roland Case Ross, Assistant Supervisor of Nature Study in Los Angeles, Calif., reports briefly upon his work as follows: "We feel that Nature Study has reached through to the children more vitally this year than ever before, as Nature Clubs and individual activities have been very conspicuous."

* * *

Frank W. Ballou Reports

In addition to school-garden work and regular weekly lessons in Nature Study in all grades of the elementary schools, Supt. Frank W. Ballou reports the following items in the Nature work of Washington, D. C., during the school year just closed: Outdoor lessons and field trips, 408; museum trips, 127; bird houses constructed, 1,600; bird feeding-shelves constructed, 148; bird baths constructed, 22; outdoor home gardens, 1,880; home window gardens, 478; telegraph and radio sets constructed, 347; sundials constructed, 3; special Nature assemblies, 49.

* * *

Nature Clubs Bulletin 25, "How to Form a Nature Club," is available to members on request.

WHO'S WHO IN NATURE STUDY

Clarence M. Weed

The normal school principal holds a strategic position in the educational field. Professor Weed, Principal of the Lowell State Normal School, is making a valuable contribution to Nature education through his attention to the Nature work in the normal and training schools, and his investigation of methods whereby Nature Study may become a more vital part of the education of American children.

As a boy, Prof. Weed spent his leisure in making collections of insects, and from this beginning there grew his love for Nature Study. One lasting influence was his association with Dr. T. A. Forbes, of which he says, "I think possibly the most interesting experience I ever had as a Nature student was the privilege of demonstrating for the first time that the eggs of the corn-root aphid are carried over in the nest of the little brown ant. This had been a matter of conjecture, and I was assigned by Prof. Forbes, whose assistant I was at the time, the task of discovering the facts of the case. I can still remember the interest with which I found some aphid eggs in an ant's nest in a corn field, and the eagerness with which I watched the development of these eggs into typical corn-root aphids."

Prof. Weed has held positions in the field of Nature education in the Ohio Experiment Station, New Hampshire College of Agriculture and Mechanic Arts, and as Regional Director of the U. S. School Garden Army during the World War. He is the author of many books on Nature subjects.

Coues—Literary Genius and Ornithologist

By T. S. Palmer

OF FEW men can it be said that they touched nothing that they did not adorn, but this characterization of the poet Goldsmith has been aptly and happily applied to Elliott Coues, one of the ablest of American ornithologists. Coues was a born genius. In no other way can be explained his command of language, his felicity of expression and his skill in drawing striking pen pictures. Neither his industry, enthusiasm, skill, nor his love of truth can adequately explain his ability to inject life and animation into any subject, however dry, and to present it in a few well-chosen words in a way to compel the attention of the reader. Into the fifty-seven years of his life were crowded accomplishments in several different fields of activity, any one of which would have been sufficient to immortalize his name. Ornithologist, bibliographer, critic, writer and historian are some of the varied rôles in which he attained eminence.

ELLIOTT COUES, 1842-1899

Not only is this series on the lives of great naturalists notable by reason of its subjects, but also by reason of its authors. This third article by Dr. Palmer comes from the pen of a man eminent in the field of science, a member and leader in many groups of scientists and naturalists, author of several outstanding works and Secretary of the American Ornithologists' Union.

Elliott Coues was born at Portsmouth, New Hampshire, September 9, 1842. When he was eleven years old he removed with his father to Washington, D. C., which became his home the rest of his life, except during the years when he led what he described as the vagabond life of an army surgeon. He was the son of Samuel Elliott and Charlotte Hayden Ladd Coues and came from New England ancestry.

Coues' early education was received at Gonzaga College. At nineteen he graduated from Columbian College, afterwards Columbian University and now known as George Washington University. Two years later he received his M.D. from the same institution and afterwards the honorary degree of Ph.D. Before graduation from college he had begun his studies in ornithology at the Smithsonian Institution under Prof. S. F. Baird and had laid the foundations for his future scientific work. At eighteen he had made a trip to Labrador, and before he was of age he enlisted in the Army as a medical cadet. In 1863 he was commissioned acting assistant surgeon and a year later was promoted to the position of assistant surgeon. His first assignment was Fort Whipple, Arizona, and when en route in New Mexico he joined the escort for the supply train he remarked to the quartermaster that he had been detailed as surgeon in charge of the column at the request of the Smithsonian Institution so that he might "shoot up the country between the Rio Grande and the Rio Colorado." Clad in corduroy, with many bags and pouches hanging on his saddle, and riding a buckskin mule which he named Jenny Lind on account of her musical notes, he made a curious figure in his dual capacity of collector and surgeon.

The seventeen years in the Army constituted the period of his most productive and brilliant work. While stationed at Fort Whipple and elsewhere in Arizona, at Fort Macon, North Carolina, at Fort McHenry, Baltimore, at Fort Randall, Dakota, and while serving as surgeon and naturalist of the Northern Boundary Commission, he collected the material for some of his most notable books. His last four years of army life were spent in Washington as secretary and naturalist of the Hayden Survey, a post which afforded him ample opportunity for completing and publishing a number of works which he had begun while in the west.

Of his literary contributions, long and short, comprising nearly a thousand titles, it is possible to mention only a few. The most important was the "Key to North American Birds," first published in 1872, which went through five editions, the last after the author's death. Perhaps no single book on birds ever had a wider or more important influence. Designed as a manual or textbook, it contained keys to the genera on the plan common in botany but until then seldom employed in zoology, and included the first important changes in nomenclature which had been introduced for a quarter of a century, and also the first general account of fossil birds. The second edition was greatly enlarged and rewritten, and with it was incorporated the "Field Ornithology" previously issued as a separate work. The last edition was extended to two large volumes, form-

ing a most comprehensive and useful compendium of information on North American birds.

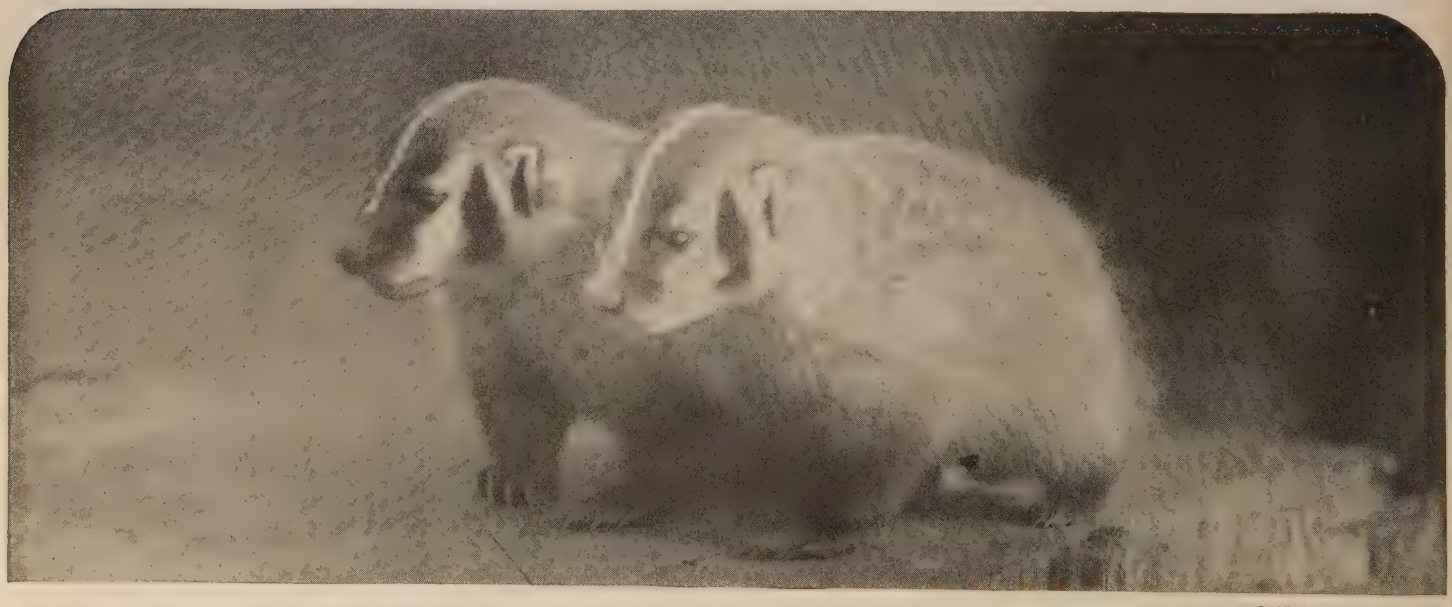
Two other classics, "Birds of the Northwest" and "Birds of the Colorado Valley," were based on the author's experiences in the northern plains region and in the deserts of Arizona at a period when these formed a part of the great frontier. In the "Birds of the Northwest" were included his notes made while on the Boundary Survey in the early seventies, and in the "Birds of the Colorado Valley" he drew on his extensive field experience in writing some of the most delightful bird biographies ever published. Here, also, was incorporated as an appendix the first installment of the "Bibliography of Ornithology," comprising a list of publications relating to the birds of North America.

The appearance of this part at once placed Coues in the front rank of bibliographers. His reputation spread abroad, and he was invited to go to Europe to continue the work. Three other numbers appeared during the next two years, including faunal publications on the birds of South America and Great Britain, and one devoted to systematic papers. All of these parts were regarded by the author merely as proof sheets to be canceled later on the appearance of the complete work, which, however, was never published. Scattered through the Bibliography may be found interesting comments on his own works, and words of praise and occasionally sharp criticisms of others in whose works he was particularly interested. One other ornithological publication deserves mention in this connection, a list of the birds of the District of Columbia, originally prepared in cooperation with his friend and fellow-student, Dr. D. W. Prentiss, which first appeared in 1861 and was republished in 1883. Coues was also an artist of some ability, and several of his ornithological works were illustrated in part by his own pen-sketches.

His publications on mammals, although voluminous, were far less important than those on birds and, in common with other works of that period, were based on insufficient and poorly prepared specimens. The best known of these works were the "Monographs of North American Rodentia" and a smaller volume on "Fur-bearing Animals," both pretentious publications, but unduly emphasizing the idea that most of the species were then well known, a supposition which in later years proved to be entirely erroneous.

During the years from 1884 to 1891 his time and energy were largely devoted to work on the "Century Dictionary," in which he had charge of the departments of general zoology, biology, and comparative anatomy. It is said that he furnished some 40,000 definitions, and in many of them he appeared at his best in condensing a maximum of information into a minimum of space without sacrificing clearness. On the completion of the "Dictionary" he took up what proved to be one of his great works in editing certain early explorations west of the Mississippi River. His "History of the Expedition of Lewis and Clark," in four volumes, was followed in rapid succession by eleven other volumes devoted to the expeditions of Zebulon M. Pike and the travels of Alexander Henry, David Thompson, Jacob Fowler, Charles Lapentuer and Francisco Garces. All of these, except the expeditions of Lewis and Clark, and Pike, were based on material previously unpublished, and each was fully annotated with characteristic care and accuracy, based on personal knowledge of the region and its natural history.

During the summer of 1899 Coues journeyed to the southwest, and while engaged in retracing the route of Garces became seriously ill and remained at Santa Fe a month until he was able to return home. His condition, however, was critical, and early in December he was taken to Johns Hopkins Hospital in Baltimore. Here he was compelled to undergo two surgical operations, and shortly after the second one he succumbed from exhaustion on Christmas Day, 1899. In the hallowed ground of Arlington National Cemetery, Elliott Coues, illustrious disciple and interpreter of Nature, now rests from his labors, but no successor has yet appeared to fill the place which he vacated or to take up the pen which he wielded with such consummate skill and force as writer, critic and editor.



THE BADGER TWINS POSE FOR THEIR PICTURE

PHOTOGRAPH BY J. G. ALLEN

NEW EDITION OF FORESTRY PRIMER READY

Thousands of Organizations and Schools plan Programs in connection with tree planting based on the booklet

IN READINESS for the thousands of club programs and the reopening of the schools this fall, the American Tree Association announces the fifth edition of the Forestry Primer which it published to mark 1926, the semi-centennial of the first step in forestry by the United States Government. Every member of the tree-planting army and the American Nature Association should send for a copy of this booklet. It sets forth the forestry situation and the importance to the nation's future of putting our millions of idle acres to work growing trees.

Through the fall and winter forestry programs are planned by thousands of organizations. It is to meet the constantly growing demand for information as to the forestry situation that the Forestry Primer is now at the half million mark. These programs center around Arbor Days in many states, particularly those to the south.

Forest fires this summer seem to be on their way to set a record. In five states these fires have been raging for many days. Because the news accounts of these fires have been told in the newspapers, public attention is again turned to the importance of increasing fire protection for the forest areas. Thousands of men have been battling in the forest fire zone in five states where a dozen lives have been lost. Soldiers from Fort Missoula were sent to the fire front that has swept 30,000 acres on all sides of Glacier National Park. Outside the Boise National Forest, 100,000 acres have been fire-swept.

In California, Idaho, Nevada, Montana, and Washington, the situation "assumes a more serious aspect than at any time in the last decade," foresters say. Forest fires seem far away to the bulk of our population, but they mean something to the whole nation.

California faces one of the worst fire seasons in her history. Fires have been burning in the northern and central part of the state, many of which were entirely out of control.

In 1924, twenty-nine million acres were swept by flames, according to the Forestry Primer. It is estimated it would cost three hundred million dollars to reforest this burned-over land, and that it would take almost three hundred years to accomplish it at the rate we are now doing it. There is a great lesson in knowing how long it takes Nature to produce man's best friend.

There were ninety-two thousand forest fires in the United States in 1924. This was at the rate of two hundred and fifty every day. A large percentage of these were caused by carelessness of tourists and campers. By automobile millions of people go into national and state forests. These millions must make the proper handling of fire their first concern. The terrific drain on our forest products by fire losses must be cut down much closer to the point where lightning only can be blamed. The Forestry Primer has a chapter on this phase of the forestry situation that should be read in every school and to every organization in the land.

Among other facts presented in the Forestry Primer showing the great part forest products play in our economic life are the following:

We use about 24,000,000,000 cubic feet of wood a year, while forest fires and insects destroy two million feet more.

Something like 5,000,000 trees have to be cut every year to maintain telegraph and telephone wires.

Estimates show we use 500,000,000 fence posts in this country every year.

Industry uses 200,000,000 cubic feet of wood every year in mining and excavation operations.

It also sets down the fact that in 1924 forest fires swept 20,000,000 acres, doing a damage of $38,000,000.

The primer offers many opportunities to teachers for providing pupils with data from which essays can be written and talks made. In thousands of schools teachers adopted this plan in the first half of the school year. The primer gives the facts upon which women's organizations and business men's clubs can base their feature programs. For a two-cent stamp the American Tree Association will be glad to send you a copy.

* * *

The tree-planting army again swings into action this fall. The women's clubs have big plans underway as have the American Legion, Scouts, Camp Fire Girls and commercial organizations which are taking up the town forest idea. The American Tree Association has a Town Forest booklet, tree-planting instruction, tree day programs and application blanks ready for the tree planters. All the tree planters are registered on the national honor rolls.

* * *

At New Rochelle, N. Y., Mrs. L. E. Van Etten of the Federation of Women's Clubs reports the planting of 770 trees.

* * *

More than 3,000 trees have been planted at Miami, Fla., under the direction of J. Gerry Curtis, superintendent of Parks and Playgrounds. The line formed at 6 o'clock in the morning.

* * *

Memorial trees have been planted at Clinton, Iowa, in honor of the city's first park board. Mrs. Ansel O. Cole reports plans underway for a Recreational Economic Center where only nut trees will be planted and a Recreational Educational Center in which no two trees will be alike.

The largest class in the history of the St. Petersburg, Florida, High School, planted a Class Memorial Tree.

* * *

The Junior Agricultural Club of Chilesburg, Kentucky, planted 24 trees presented by the Garden Club of Lexington. The Juniors hold the Phoenix National Bank & Trust Company trophy for good work.

* * *

Members of the Woman's Club, of Pittsburgh, celebrated their first forestry day in six years by planting five trees. The first ceremony was held around the Golden Jubilee Tree, planted to commemorate the fiftieth anniversary of the club, while the other four were planted for past presidents. The officers thus honored were Mrs. George Price, Mrs. H. C. Reller, Mrs. R. W. Johnston, and Mrs. Edmond Englert.

* * *

The Camden, New Jersey, Women's Club planted an Oriental plane tree in Forest Hill Park in memory of Mrs. William B. M. Burrell, vice-president and director. This follows a custom of twelve years. Members of the Junior Section of the club who sang Joyce Kilmer's poem "Trees" were: Mrs. William H. Partenheimer, Mrs. Fred J. Hained, Jr., Mrs. Fred B. Hutchinson, Miss Margaret J. Riggs, Mrs. John M. Willie, Mrs. Emily Stephens, Mrs. Ernest V. Abrams and Mrs. H. Curtis Paschall.

* * *

The Concord, New Hampshire, Post of the American Legion planted 40 maple trees and several thousand pines as living memorials to the men who gave their lives during the World War.

* * *

Girl Scouts planted 100 pine trees in Brand Park, Glendale, California, to be known as the Girl Scout Grove. The Girl Scouts' executive is Mrs. Anna L. La Grange.

* * *

Boy Scouts of Grand Haven, Michigan, planted a thousand Scotch pines sent by the Michigan State College under the direction of C. P. Milham and R. F. Kroodsma.

* * *

Fifty tree planters in School No. 78 at Indianapolis, Ind., have joined the tree planting army, Bertha Holle, the principal, reports.

* * *

At Port Washington, N. Y., Mrs. LeRoy Barton reports 125 new members for the tree planting army. Nine memorial trees were planted there by American Legion Post 509.

An Eccentric Egg

No, it is not a gourd pictured in the illustration but one of two freak eggs laid by a hen on the farm of B. W. Moncrief, of Prattville, Ala. Mr. E. N. Graves, of Montgomery, calls them to our attention. Not only were

the eggs equipped with a strange appendage, but they are remarkable in size. The egg shown was six inches in circumference and seven and three-eights inches around lengthwise. From the center of the large end to the end of the appendage the measurement is five and one-half inches, Mr. Graves reports.

South Africa Acts

Readers of NATURE MAGAZINE have a distinct interest in the problems of wild-life preservation in South Africa through our long-distance acquaintance with Warden Vaughn-Kirby, of Zululand. They will, therefore, be interested to know that a marked sentiment for preservation of the fauna of this rich land is gathering momentum daily. A widespread and well supported movement is on foot for the creation of a National Kruger Park in the area known as the Sabie Reserve in the Transvaal. This section is the home of lions and a great variety of the striking antelopes of South Africa. Extension of this work is planned on the Cape and in Zululand. The activity has gotten to the legislative stage and seems to indicate that South Africa is awakening to the need of conserving some of her riches in order that visitors may appreciate them.

"El Ombú"

That eminent writer of the romance of the "River Plate" region of South America, W. H. Hudson, wrote a little book called, "El Ombú," in which he describes the mysteries of the national tree of the Gaucho country, the "Ombú." He tells of the superstition among the natives that should one chance to sleep in the moonlight under el ombú, he will awake crazy, and they will cite many instances to prove it. Mayhap there is some truth in the superstition, but in these days of radio, and other modern inventions we are prone to look with skepticism upon things legendary. However, I have yet to find anyone brazen enough to try it out.

The tree itself resembles our spreading white oak, but is an evergreen with broad leaves. The trunk is short and

stocky, and the crown dense and spreading. On the streets of Buenos Aires it makes a delightful shade tree, and in the open country it is an oasis to the traveler. Botanists have given it the name of *Phytolacca dioica* and place it in the same family as our common poke weed.

An Odd Nest Site

Casting about for a good homesite one day, a yellow warbler decided on a peach tree. There the bird built, but on a foundation of a young peach, judging from the nest that James Harris Tate found on the ground beneath

the tree one day. Being an ardent young naturalist, he was much excited. The best deduction he could make was that the small peach had laid against the limb on which the nest was built. It grew and gradually forced the nest away, falling with it to the ground. It is certainly an unusual find.

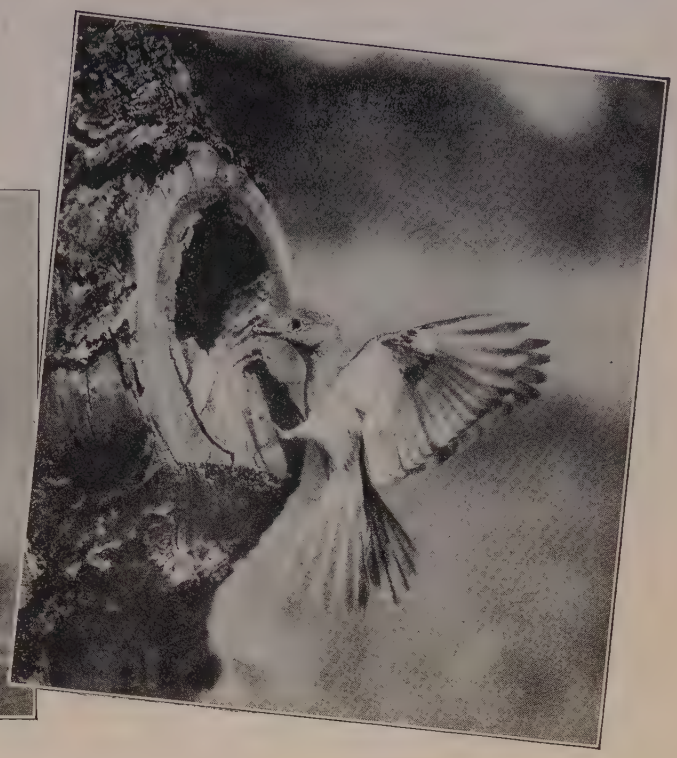
To Investigate Lands

Frank Bond, chief clerk of the General Land Office of the Department of the Interior for the past nineteen years, has been transferred to the Bureau of Biological Survey of the Department of Agriculture. He will make special investigations of federal lands in connection with the establishment of the Upper Mississippi River Wild Life and Fish Refuge.

Narcissus Quarantine

The domestic narcissus bulb quarantine proposed to prevent the spread of bulb flies and eelworm pests was signed July 3 by Secretary of Agriculture Jardine to become effective July 15, 1926.

Right—from an exposure of 1/1000
Below—from an exposure of 1/5



For nature pictures—a Graflex

Interesting specimens are commonly found in the shade, moving, at a distance that's hard to guess.

Yet clear-cut, detailed pictures can be made under such conditions—with a Graflex. Its fast lens permits snapshots in the woods, its focal plane shutter (speeds of 1/5 to 1/1000) can match any action, its reflecting mirror shows for certain whether focus is sharp.

Since the Graflex user needn't lure a subject into the sun or wait for quiet or measure for focus, his pictures of wild life are bold and natural.

The Latest Graflex

Cooke Anastigmat f.2.5, three times as fast as the fastest lens ever before offered on a Graflex, is a feature of the latest model. Rain or shine, early or late in the day this camera can make a striking negative. Its full name is 3¼ x 4¼ Revolving Back Graflex, Series C. Price $260.

Prices of Graflex cameras with lens now begin at $58.50. Visit your dealer or write to Rochester.

Graflex cameras are now made by
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Illustrations that you have admired in this magazine were probably made with the Graflex.

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Plant bulbs in quantity this fall for a gorgeous display of radiant blooms next Spring. For your consideration a selection of a few of the outstanding varieties of Darwin and Breeder Tulips are listed below.

Name	Color	Price per Hundred
Pride of Haarlem	Rose Carmine	$4.50
Clara Butt	Salmon Pink	4.25
Valentin	Light Violet	6.50
Dream	Delicate Lilac	4.50
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Baronne de la Tonnaye	Vivid Pink	4.50
Inglescombe Yellow	Clear Yellow	4.50
Golden Bronze	Golden Hue	5.00
Cardinal Manning	Rosy Violet	5.00
Zulu	Almost Black	4.25

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	Varieties	100	50
Darwin Tulips	15	$3.75	$1.95
Breeder Tulips	10	4.00	2.10
Cottage Tulips	8	3.50	1.85
Crocus	5	2.50	1.20
Narcissus	5	9.75	5.00

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We have heard this comment on a Bent Lawn: "It's so perfect it looks artificial." Do you want this said of your lawn? Then, read all about this unusual grass in our illustrated booklet "Bent Lawns," which will be mailed on request. It is a valuable treatise on how you can have beautiful lawns.

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THE FORESTRY PRIMER

Write to American Nature Association
Washington, D. C.

Pack Prize Winners

Pei Sung Tang was one of the winners of the Charles Lathrop Pack Foundation Prize awarded at the University of Minnesota, Division of Forestry, for the two best forestry essays during the year. Mr. Tang wrote upon "The Effects of Deforestation on China," a subject which contains much that should give pause to the people of the United States. This essay won second prize, the first prize going to A. L. Nelson for his essay entitled "The Discovery of the Forests."

The Pack Prize at the University of California was divided among three members of the Department of Forestry, the first prize going to Howard W. Siggins, second prize to Kenneth McLeod, Jr., and the third prize to R. B. St. John. At the college of Forestry at Syracuse University Albert E. Ritchie, of the class of 1928, won the Pack Prize of $100.

Mr. Pack has established these prizes in the interest of forestry, contributing an endowment for this purpose. Through them he seeks to promote the cause of forestry as it relates to the public, or from the public's point of view, and the prizes are awarded for the best forestry essays presenting in popular form some phase of the forestry problem.

A Beaver Trap

Vernon Bailey, biologist of the United States Biological Survey, has done a distinct service to wild kind in his work toward the goal of humane trapping. One of the most notable products of his invention has been the beaver trap used by the Survey to capture alive and painlessly beavers for control and propagation. Mr. Bailey has embodied the specifications and directions for the making of this humane trap in a bulletin which is published by the United States Department of Agriculture as Miscellaneous Circular No. 69. Copies may be obtained from the Biological Survey as long as the supply lasts.

At the moment of recording this humane invention there comes to hand a note from Mr. Charles H. Kip, of New York, telling of the result of the other kind of trap when his eight-year-old and much-beloved cat put his foot in it. The cat suffered a broken and mangled leg. A subsequent note from Mr. Kip tells us the sad news that Popsy, having survived the trap episode, fell prey to an automobile and has been sorrowfully laid away.

We Thank You

In reprinting the following from *Camping,* the official journal of the Camp Directors' Association, we should like to pay tribute to that most attractive and helpful publication. No camp should be without it. The May-June issue of *Camping* is kind enough to say:

"Out there at Cornell University lives one of the few live wires in Nature lore. He is ready to help any director or counselor who wants to know anything about the technique of Nature lore in camp. You'll remember his methods: First, by *true* stories; second, by pictures made day by day; third, by poems; fourth, by Nature games (and if you do not play these at your camp you are antediluvian); fifth, by walks afield and in the woods; sixth, by Nature plays written and acted by the campers. Dr. Laurence Palmer is, besides a professor at Cornell, one of the editors of the NATURE MAGAZINE, and to be without that splendid journal through the year as a preparation for introducing our boys and girls to the Great Mother of us all during the summer is not only antediluvian, it is pleistocene."

Chief Game Warden

Harold P. Sheldon, fish and game commissioner of Vermont, has been appointed by Secretary of Agriculture Jardine to be chief United States game warden of the Bureau of Biological Survey. He fills the vacancy caused by the resignation of G. A. Lawyer and assumed his new duties early in July. Mr. Sheldon is placed in charge of the enforcement of two federal protective laws, the Migratory-Bird Treaty Act and regulations protecting birds migrating between the United States and Canada, and the Lacey Act regulating interstate commerce in game.

First Convention

Resolutions urging the preservation of Cumberland Falls in Kentucky, better protection for wild game birds and institutional training for park executives were among those passed by the National Life Conservation Society at its first annual meeting at Lakeville, Connecticut. Many subjects relative to the conservation of natural resources as well as human life were discussed at the sessions and in addresses Mrs. Charles Cyrus Marshall was reelected president.

Acres of Beautiful Blooms

The above view of one of the Brand Peony Farms was taken the last week in June, 1924, a week after the National Peony Show at Des Moines, Iowa.

The World's Most Beautiful Peonies

Never before in our more than fifty years growing peonies have we had such an unusually large assortment of wonderful choice varieties as we are offering for this fall planting. Flowers from this stock, competing with those entered by all other growers, won the three highest prizes at the greatest National Peony Show ever held.

Brand's Peonies awarded Gold and Silver Medals at National Peony Show. Brand's Peonies awarded Grand Sweepstakes at St. Paul Peony Show. Brand's Peonies awarded American Peony Society Medal at Minneapolis Peony Show.

You will want some of these, the world's choicest and most beautiful peonies, for your fall planting, therefore, write today for Brand's Free catalog of Peonies and Iris, giving varieties with full description, and prices.

BRAND'S BIG PEONY MANUAL, which we consider the most complete and up-to-date work ever written on the Peony, gives the history of that flower, its culture and varieties. This also will be sent free to all who intend to purchase roots this fall who ask for it.

Growers of Peonies for nearly sixty years

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With Very Complete Descriptive Text

The life cycle of each tree is described as well as illustrated. The book tells the general characteristics of trees, how they change each season, why they drop their leaves, how they prepare their flower and leaf buds for new growth, etc. In addition to native trees, there are chapters on the new imported varieties. In selecting trees a study of this book will prevent many mistakes. The pictures show how each type will blend with its surroundings. Many valuable hints are given and the author reveals the great possibilities in tree planting as an adornment for gardens and lawns. The complete book is an authoritative guide to the fit and beautiful in arboriculture showing what species are suitable for street, garden, small park and woodland planting. Practical directions are given for aiding trees to thrive and look their best.

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Hardy—Large blooms and more of them each year. No flower grown attracts as much attention as the Peony. We are growing this year the best collection ever grown on our Peony Farms.

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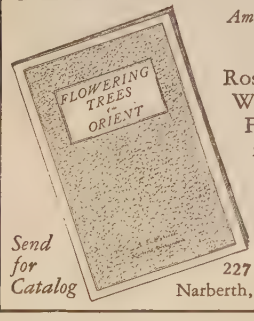

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Obliging Flickers

"I have a bird bath in my back yard, which is very popular with all the birds, though used mostly by the robins," writes Eleanor P. McCook of Salt Lake City. "On one of the mornings of last November, there was a quarter of an inch of ice on the water in this bath, and many of the birds, English sparrows, song sparrows, robins and others who were accustomed to drink from it, were sitting around it disconsolately, or hopping out on to the ice and back again.

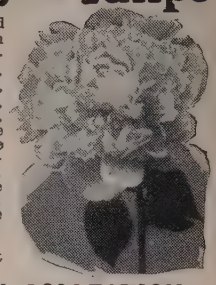
"Just as I was going out to break the ice and put in some fresh water, there was a rush of wings, and two flickers came down and lit on the ice, two powerful bills went into action, and with a noise like two machine guns the ice was cracked into hundreds of pieces. The flickers did not stop to drink or bathe, but flew away at once, while the other birds swarmed around the rim of the bath and began drinking.

"I do not know what frightened the flickers away or whether they were really frightened away from taking a drink, or whether they only meant to help out the other birds, I relate the incident just as it happened, and perhaps some reader of NATURE MAGAZINE may be able to figure it out."

A Wily Woodpecker

"We called him King of the Bread Tree, for he was no ordinary bird," writes Mr. L. M. Snodgrass of Youngstown, Ohio. "This sturdy, well-groomed red-headed woodpecker far excelled in intelligence the many others who frequented my back yard. He chose for his special use an old, worm-eaten tree with many small holes, few branches and not a single leaf. There he would sit by the hour on guard, not allowing another bird to come near it. They kept him busy, too, for they knew a good thing when they saw it. Each day I threw bread, sometimes buttered, out on the lawn, or saltine crackers. The King enjoyed flying down to get his share, but he did not eat it. Instead, with much excitement and haste, he worked hard filling the many holes of his tree with it, hammering it in like a dentist with a filling. Then he would turn and fly up to his pet branch, waiting patiently for the ants that would climb this tempting tree, so filled with bread. It attracted many, and when the sly old King figured there were enough to satisfy his appetite, he flew down to the base of the trunk and walked his way up eating ants as he went. No wonder this sleek, well-fed fellow returned several seasons to the same summer resort."

Rare Offer
of Peonies and Tulips



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12 for 60c
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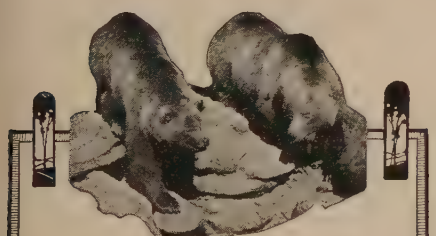

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Blister Rust Rules

Tentative quarantine measures involving the entire Continental United States on account of the white pine blister rust disease have been drafted which embody the restrictions discussed at the public hearing before the Federal Horticultural Board June 30, 1925. The proposed quarantine would replace all existing blister rust quarantines and is expected to become effective September 1, 1926. This measure prohibits or restricts the movement of five-leafed pines and currant and gooseberry plants from any state.

Marking Timber

The principles of timber marking, as followed by the forest rangers in our National Forests, are outlined in a two-reel film, "Marking Timber," just released by the United States Department of Agriculture. Photography for this picture was made in the beautiful Black Hills, in western South Dakota, and while the marking shown is confined to the western yellow pine of that region, the methods illustrated are applicable in large measure to forests of other types.

Shade Tree Conference

Consideration of the various problems surrounding the growth and care of shade trees, including the art of tree surgery, brought foresters, entomologists, plant pathologists and many others to the Third National Shade Tree Conference held at Philadelphia August 2 and 3. Besides the discussions presented at the conference sessions, the delegates visited estates, greenhouses and arboretums and gave particular attention to the Japanese Beetle project at Riverton, N. J.

In a paper citing some essential points in the care of shade trees, F. L. Mulford, Horticulturist of the United States Department of Agriculture, stressed the importance of planting trees only in a climate to which they are adapted, as well as carefully choosing the soil and location for the trees. Dr. E. P. Felt presented the problems of shade tree protection against insect pests.

The conference was more largely attended than its predecessors, testifying to an increased appreciation of the importance of shade trees and their care. Dr. Haven Metcalf of the United States Bureau of Plant Industry is permanent chairman of the conference.

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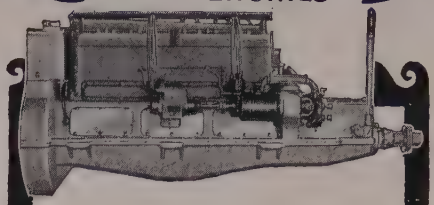

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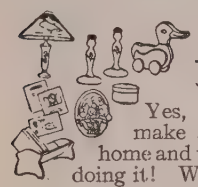

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Questions and Answers

The American Nature Association will be glad to answer each month such questions as its members ask about Nature.

Question: *How does the King Snake get its name, is it poisonous, and does it kill rattlesnakes?*—M. P. B.

Answer: The King Snake gets its name from the fact that it subsists partly on other snakes, often overcoming and swallowing individuals of other species nearly as large as itself. It has been known to kill poisonous snakes of several species, including rattlesnakes. Though found in some form over much of the United States, except the northwest coast region, it is not partial to arid sections, and so does not come into contact with many species. It is nonpoisonous and harmless.

Question: *Will you kindly tell me about wood ticks?*—J. U.

Answer: There are many kinds of wood ticks but they all have about the same life history. They lay eggs, from which tiny six-legged young are hatched. In order to develop, these must feed on the blood of some animal. After this feeding they rest and shed their skins, and then have the eight legs of the adult. In order to produce eggs they must again seek a host, and this explains their desire to attach themselves to the human body. They are widespread in tropical and temperate lands. They must be picked from the human body, unless one waits until they become engorged and drop off. No method of exterminating them is known.

Question: *Is it true that bats are blind, and how do they produce their young?*—A. R. O'L.

Answer: Bats, like all the higher mammals, bring forth their young alive and nourish them by nursing. They are by no means blind, and can see both at night and in the daytime, though they hunt their food, which, in our species, consists entirely of living insects, mainly in the twilight hours. They have acute hearing and are guided very largely by this sense. Their teeth are very sharp and they will bite if roughly handled, but they are easily tamed. From their habit of eating such quantities of insects, they are highly beneficial.

Question: *Along the Mississippi I recently saw a blackbird with a yellow head. Is this a species or a freak?*—J. K. K.

Answer: The blackbird you saw was a very distinct species, the yellow-headed blackbird (*Xanthocephalus xanthocephalus*). It is a bird of the prairie sloughs of the Great Plains region, and extends north into central Canada. It nests in the rushes, often in company with the redwing.

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QUESTION: *What is the fastest bird?*—B. S.

ANSWER: Some of the large swifts of India, which can fly close to 150 miles an hour, are supposed to be among the fastest birds. Very probably some of our large central American swifts are nearly or quite as fast.

QUESTION: *Are the lady-bird beetles beneficial?*—W. T. T.

ANSWER: The lady-bird beetles are all beneficial, excepting one, a large orange-colored species, with black spots, which feeds in both the larval and the adult stage on the leaves of squashes and such plants.

QUESTION: *What is generally used on the cuts of fruit trees after a limb has been cut off to prevent bleeding and help healing?*—G. G. L.

ANSWER: Covering the stub when a limb has been cut off has no bearing on the healing of the wound, except that it helps to arrest decay until the surrounding tissue can close in and cover the wound. White lead paint, applied heavily, and renewed if necessary, is a good covering.

QUESTION: *We were watching grasshoppers jump across our lawn, and suddenly an odd insect jumped near us and one of us threw a handkerchief over it. It looked very much like a grasshopper, but it was colored a beautiful pink. Are there pink grasshoppers to "keep step" with white crows?*—A. S.

ANSWER: The pink insect was probably one of the long-horned grasshoppers usually called katydids (but not the true katydid, which stays up in trees). These are typically green but occasionally are brown or a bright pink, these being color phases, or "sports." The common species is *Amblycorypha oblongifolia*. It lives usually in low bushes, but is often seen on the ground.

QUESTION: *How long will deer and moose live?*—D. M. P.

ANSWER: Moose reach their full maturity at about seven years and may live to eighteen or twenty years. Deer in general probably live nearly as long.

QUESTION: *I understand that there are some vegetarian wild animals whose young do not have a scent which enables them to be hid by their mothers and not detected, except by sight or sound, by carnivorous beasts. Is this true?*—H. B.

ANSWER: The apparently almost perfect immunity from detection enjoyed by the young of elk, deer, moose and other related animals seems to be explainable on no other ground than that they are devoid of scent. A similar immunity seems to favor the young of some birds, the adults of which are easily followed and detected by scent. Some think it may be due to the young animal remaining perfectly quiet, though this does not fully explain the matter. Such phenomena are, of course, very difficult to explain, since we lack the faculty of detecting such animals by the means used by their natural enemies.

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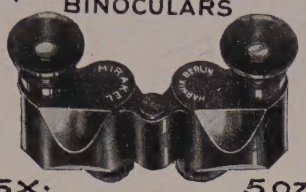

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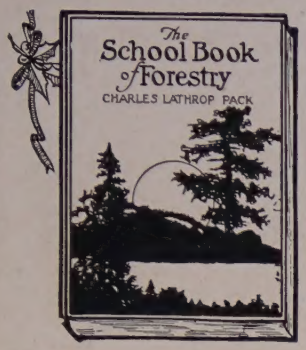

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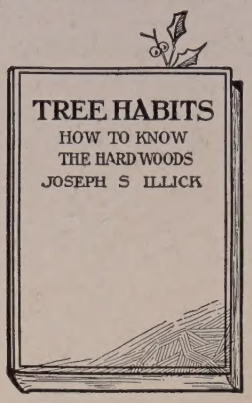

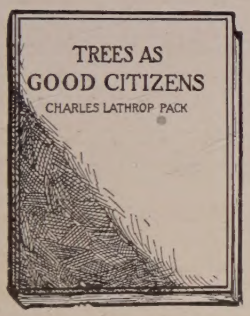

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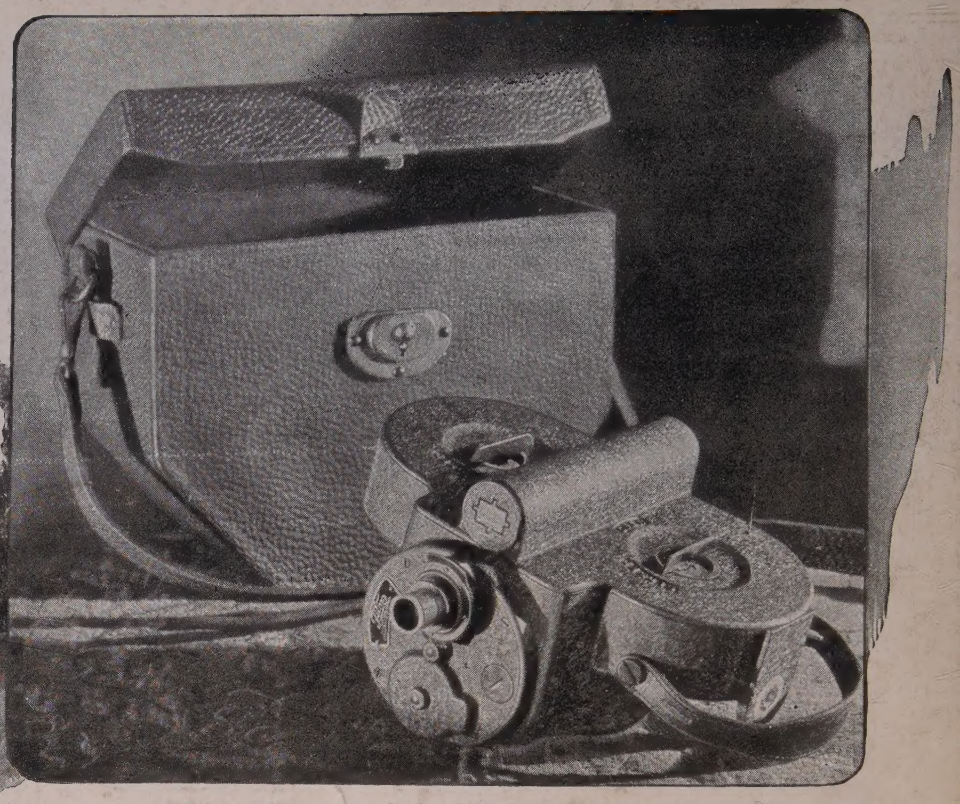

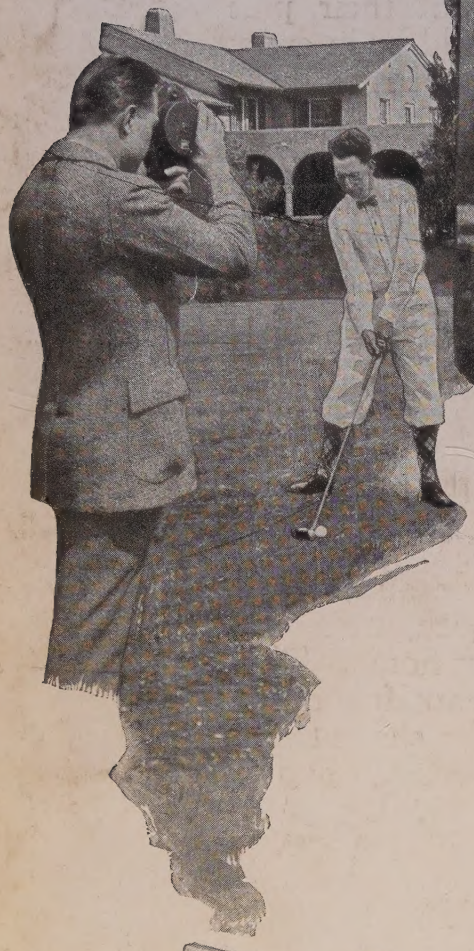

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